

# CTO

THE MAGAZINE FOR INFORMATION EXECUTIVES

NOVEMBER 1, 1993

VOLUME SEVEN NUMBER THREE

SEVEN DOLLARS

## COVER STORY

# No Pane, No Gain

*How Reengineering  
Helped Andersen  
Get More Windows  
Out The Door*

## ALSO INSIDE

**WAN  
Strategies:  
Making  
The Most  
Of The  
Bandwidth**

AN INTERNATIONAL DATA GROUP PUBLICATION

Andersen Corp.'s  
Mike Tremblay







imagine rising far above the barriers



Running a business will always  
have its hurdles. But getting all  
of your information systems to work  
together shouldn't be one of them.  
Enter: Digital. The people at Digital  
have the technology and expertise  
to help your people work smarter  
by sharing information better.  
No matter what systems you rely on  
or which companies they're from,  
Digital will help you rise above  
existing barriers. And as your  
needs change, we'll keep new  
barriers from forming. Imagine...  
getting the jump on the competition  
by giving your people access to  
data and ideas when and where  
they need them. That's Digital.  
With a proven track record of customer  
success. To find out more about  
Digital Multivendor Customer Services,  
call 1-800-DIGITAL.

PUTTING IMAGINATION TO WORK

between systems.

**digital**<sup>TM</sup>



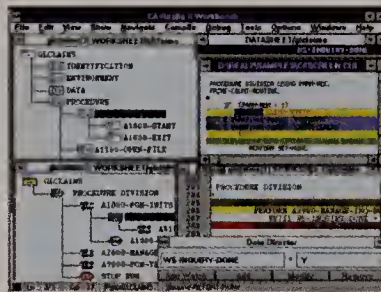


# Guess What Happens When You Off-Load Development With A "Micro Focus."

Issues like off-loading development and right-sizing are far too important to approach with a limited "micro focus".

You need a macro focus and a comprehensive, integrated solution like CA-Realia® II Workbench. It's the first totally integrated, comprehensive GUI-based approach that combines point-and-click ease of use with all the industrial-strength components you need.

CA-Realia puts it all at your fingertips in a single, integrated interface: mainframe connection, lifecycle manager, compiler (the fastest in the industry according to *Computerworld*), analyzer, debugger and CICS emulator. And CA-Realia is more flexible, so you



**\$2500.**  
For A Limited  
Time.

can off-load development at your own pace with safe, proven technology and an experienced partner. Unlike Micro Focus, CA is a proven leader in mainframe development. With over 16 years experience and tens of thousands of clients around the world, we can help you make off-loading development safe, productive and predictable.

**For A Free Information Booklet  
Call 1-800-225-5224, Dept. 26101.**

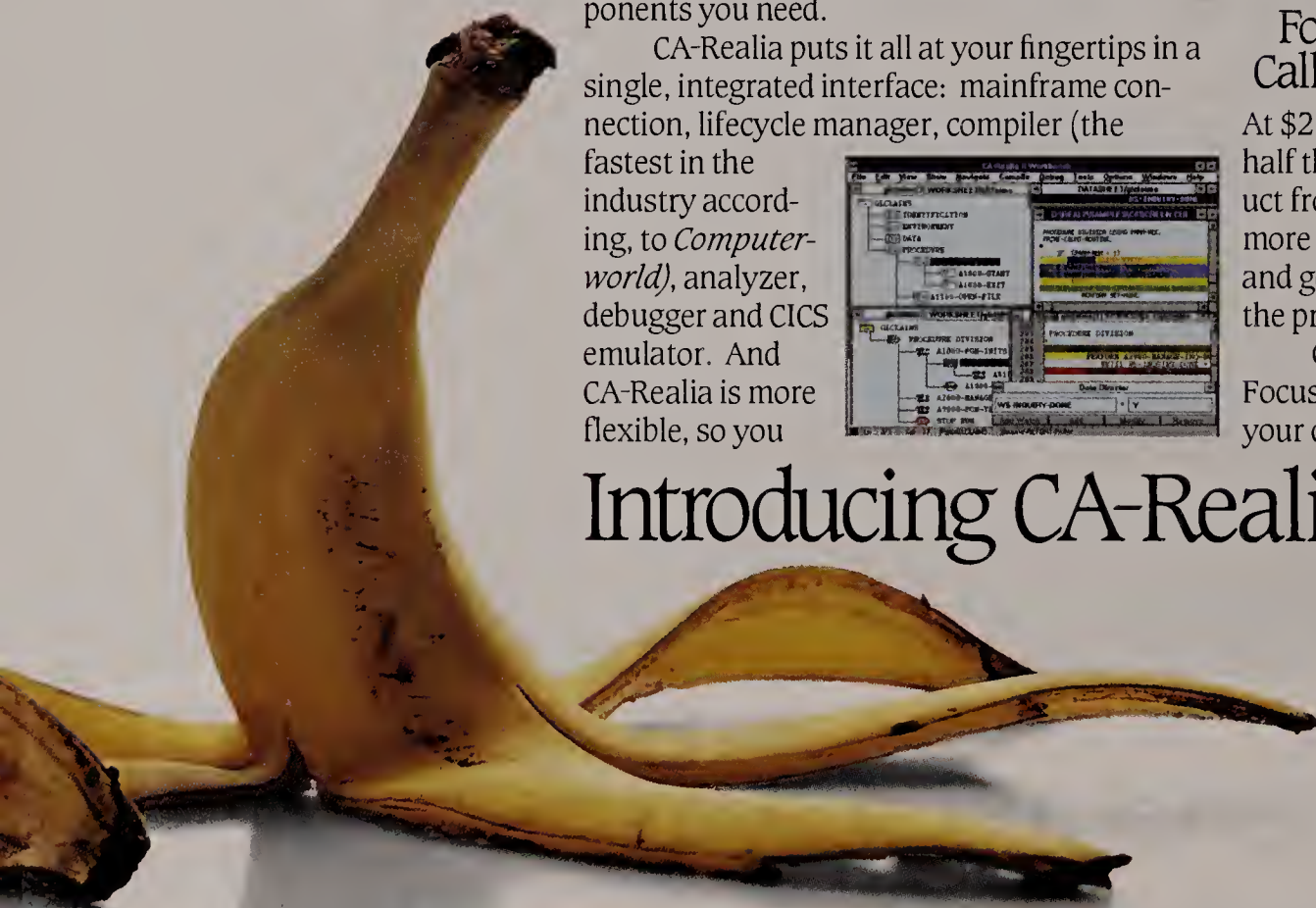
At \$2,500 CA-Realia is less than half the price of the equivalent product from Micro Focus, so why spend more to get less? Choose CA-Realia and get twice the product — at half the price.

Or choose Micro Focus and take your chances.

**COMPUTER  
ASSOCIATES**  
Software superior by design.

The Secret  
Of Cobol  
Maintenance

## Introducing CA-Realia® II Workbench





# CIO

VOLUME 7, NUMBER 3

## COVER STORY

REENGINEERING

46

### No Pane, No Gain

After moving to mass customization, Andersen Corp. realized that customer satisfaction takes more than unique products. The company also had to deliver those products to the right place at the right time. So Andersen changed its business processes so that standard and custom offerings roll out with equal speed, accuracy and efficiency.

*By Megan Santosus*



Andersen's  
new outlook 46  
Cover photo by Steve Niedorf

## FEATURES

COMPUTER-AIDED SIMULATION

34

### Some Simulating Experiences

Using computer-aided simulation, companies are taking a little mystery out of life—and a lot of the risk.

*By Mickey Williamson*

WIDE AREA NETWORKING

62

### WAN Way or Another

Faced with numerous options, companies are pursuing the wide area networking strategy most likely to give them the bandwidth they need, when they need it.

*By Charles Pelton*

INTERVIEW: TECHNOLOGY AND SOCIETY

74

### Postman's Progress

Technology has forged a Faustian bargain with mankind—making our lives easier while it saps our souls, erodes our social structures and drowns us in useless information. Social critic Neil Postman expounds on the hidden price of progress.

*By Lew McCreary*

MORE ►►►

*Too much of a  
good thing 74*



Model  
behavior 34







# We've Made This Trip Thousands Of Times. And Never Lost A Customer On The Way.

It's quite a ride.

The move to open computing systems is often described as traveling through permanent white water. So it's not the kind of trip you want to take without an experienced guide.

And that's where Sequent® Computer Systems can help. As both IDC and Infocorp have recently confirmed, Sequent leads the computer industry in mid-to-high end open computing systems.

With our enterprise servers for both UNIX and Windows NT<sup>™</sup>, and our consulting and integration services, we've helped thousands of customers worldwide make the trip to open computing. We've helped companies downsize from mainframes, upsize from PC networks, and re-engineer entire computing enterprises into a client/server environment.

Over and over again, working in complicated multivendor environments, with all the complex interdependencies between hardware and software, we've made sure that our customers make it safely through the white water.

That's because everyone at Sequent is 100% committed to the complete success of every installation, and empowered to deliver it. Not just for our own hardware, but for everything in the system, hardware and software, no matter who the vendor may be.

So even though there may be no way to avoid the white water, we can help make the whole trip a lot safer.

To find out more, call us at 1-800-854-0428.



**SEQUENT**

*Our Business Is Your Success*





# How do you know training even works? Good question. It's time you were given a good answer.

IBM is a registered trademark and Skill Dynamics is a trademark of International Business Machines Corporation. ©1993 IBM Corp.

Anybody can promise you impressive results from I/T training. And they do.

But wouldn't it be great if a training company would provide hard and fast proof of the effectiveness? Hold that thought.

Meet Skill Dynamics.

We've developed a bold approach to training that you've probably never seen.

Our exclusive 7-step approach begins with your business needs and ends with *business results*.

Our consultants can show you in black and white how, when, where and why your employee training is doing what it's supposed to be doing.

It's based on sitting down with you and mapping out a training strategy that's tied to your own *business objectives*.

We work *with* you to ensure that courses deliver the improvements you want in quality, profitability and employee and customer satisfaction.

Our instructors specialize in Enterprise, Midrange

and Personal Systems, AIX, Client/Server Technology and Networking, Application and Systems Development, Languages, and Hardware Service Operations, among others.

If it's a question of I/T training, Skill Dynamics could very well be the answer.

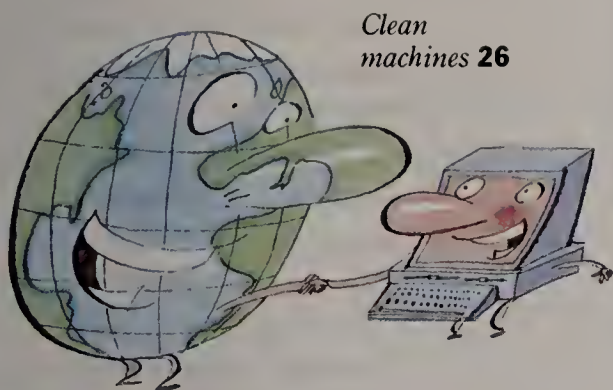
To find out how you can get a free initial consultation on our 7-step approach, or for a free brochure about either our capabilities or our courses and services, call us:

1 800 426-8322, ext. 1402.



**Skill Dynamics™**  
An IBM® Company





## COLUMNS

### TECHNOLOGY AND THE ENVIRONMENT

26

#### INSIGHTS: IT'S EASY BEING GREEN

A new EPA program is helping organizations cut costs and air pollution through energy-efficient computing.

*By Brian Johnson and Linda Latham*

### COMMUNICATIONS

86

#### FRONTLINE: A TELEPHONE FOR THE 21ST CENTURY

The development of small, multimedia communicators is all very fine, but what we really need is a means to identify and extract the messages we want from the flood of those we don't.

*By Portia Isaacson*

### THE INTERNET

96

#### FIRST PERSON: SOMETHING FOR NOTHING

After choosing object technology as the basis for its new technical architecture, Kash n' Karry took the methodology out for a test drive using expertise and free software gleaned from the Internet.

*By Jim Stikeleather*



*Freedom of voice 102*

### SPEECH RECOGNITION

102

#### STATE OF THE ART: VOCAL HEROES

Before long, speech-recognition technologies could provide the intuitive computer interface we've all been waiting for.

*By John Paul Kowal*

### DATA DELIVERY

112

#### WORKING SMART: SELECTIVE NEWS SERVICE

Johnson & Higgins, a New York insurance brokerage, has developed a system to access, filter and deliver relevant data to brokers' desks as they need it.

*By Carol Hildebrand*

## DEPARTMENTS

Editor's Letter 8

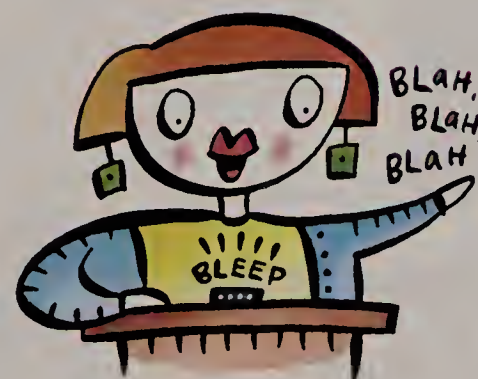
Publisher's Letter 12

Trendlines 16

- Fuzzy logic
- Internet faxing
- Calendar of events
- Heart imaging
- The rise of ISDN
- New inklings
- Tracking your assets
- Kludge redux
- Meeting minder
- Online investment
- News delivery

FYI 110

Index 111



*Moving right along 16*





With information technology becoming such a significant part of society's infrastructure, every once in a while it is necessary to take some time to evaluate whether technology has become altogether too intrusive in our daily lives.

Aided by cellular phones, laptops, pagers and the new personal digital assistants, some people are never disconnected from work. It's not unusual to see people in restaurants interrupt face-to-face conversations in order to answer their portable phones. Our staff has even documented instances of sun-worshippers on a nude beach hooked into the cellular firmament.

On the home front, more and more information is being gathered on our consumption and purchasing habits; we are bombarded by direct-mail organizations and telemarketers. Who wants to arrive home to find two automatically dialed sales pitches on the answering machine or yet another credit-card solicitation in the mailbox?

Every so often, it is refreshing and thought-provoking to hear the views of those who question the benefits of ubiquitous technology. One such person is Neil Postman, professor of Communication Arts and Sciences at New York University and author of *Technopoly*, a book that explores the costs that technology imposes on our society.

Recently, Managing Editor Lew McCreary interviewed Postman to explore his ideas on the subject (please see "Postman's Progress," beginning on Page 72). One of Postman's major arguments is that the exaltation of technology renders irrelevant long-respected social institutions and favors the new over the old, regardless of inherent value. Before people apply technology, Postman says, they should determine the problem to which it is the answer. He also believes that the long-range contribution of computer technology may be to get rid of unwanted information rather than to create more information.

While Postman's ideas are disquieting, the application of IT at many organizations is impressive. In her article, "No Pane, No Gain," on Page 44, Staff Writer Megan Santosus explores how window-maker Andersen Corp. has used information management to solve business problems—mainly to reduce the order-fulfillment error rate on an increasingly customized and made-to-order product line.

The impact IT has on the infrastructure of our society will continue to grow. CIOs need to recognize the important position they and their organizations hold in balancing the beneficial and detrimental use of IT.

*Marcia Blumenthal*

PHOTO BY WEBB CHAPPELL



© By CIO Publishing Inc.

**Publisher/Editorial Director** JOSEPH L. LEVY

**Editor-in-Chief** MARCIA BLUMENTHAL

**Managing Editor** LEW MCCREARY

**Art and Design Director** MARY LESTER MARSHALL

**Senior Editor** THOMAS KIELY

**Associate Editor** ABBIE LUNDBERG

**Associate Editor** LEIGH BUCHANAN

**Senior Writer** RICHARD PASTORE

**Senior Writer** CAROL HILDEBRAND

**Staff Writer** MEGAN SANTOSUS

**Staff Writer** NANCY HITCHCOCK

**Copy Editor** CHERYL R. DAVIS

**Assistant Art Director** MOIRA GILLIS

**Design Associate** KIM MORNEAU

**Design Associate** KELLI WALTON

**Editorial Assistant** BROOKE R. BURTON

**Director of Marketing** CATHY O'LEARY HAYES

**Production Director** LORI BETH SADEWITZ

**Director of Finance & Admin.** WALTER MANNINEN

**Assistant to the Publisher** DIANE MARTIN

**Circulation Director** CAROL A. SPACH

**Fulfillment Manager** SUSAN WOODWORTH

**Exec. Subscription Manager** NANCY A. O'CONNELL

**Senior Promotions Specialist** MARCY L. DILL

**Production Associate** MICHAEL C. PETERSON

**Sales & Marketing Specialist** BRIDGET CAMMARATA

**Sales & Marketing Assistant** DOT CASPERSEN

**Circulation Assistant** DENISE PERREAULT

**Administrative Assistant** LYNN J. PALMQUIST

**Systems Specialist** MICHAEL DI PALMA

**VP/GM, Exec. Programs** LYNDA ROSENTHAL

**Director, Exec. Programs** DEBORAH HALON

**Manager, Program Services** ELIZABETH L. LADENDECKER

**Administrator, Exec. Programs** CHRISTINE MCCARRON

**Contributing Writers** Portia Isaacson, Brian Johnson, John Paul Kowal, Linda Latham, Charles Pelton, Jim Stikeleather, Mickey Williamson

**Editorial Offices** CIO Publishing Inc., 492 Old Connecticut Path, P.O. Box 9208, Framingham, Mass. 01701-9208

(508) 872-8200, FAX (508) 879-7784. Printed in the U.S.A.

**Subscriber Services** (800) 788-4605, FAX (508) 872-0618.

**List Services** (800) 859-LIST



**Board Chairman** PATRICK J. MCGOVERN

**President** WALTER BOYD

**Executive Vice President** WILLIAM P. MURPHY





# I Need Rightsizing Solutions.

Send me my FREE white paper and information about:

- ☐ FOCUS    ☐ EDA/SQL  
☐ Send me information about your FREE Rightsizing Seminar.  
☐ Can't wait. Please call me ASAP.

NAME \_\_\_\_\_ TITLE/DEPT. \_\_\_\_\_

COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

(      )

TELEPHONE \_\_\_\_\_

DATABASES USED \_\_\_\_\_

OPERATING ENVIRONMENT \_\_\_\_\_ MACHINE TYPE \_\_\_\_\_



Printed in USA

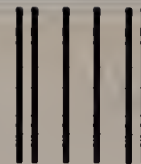
OR CALL 800-969-INFO  
FAX: 212-629-8819

**Information Builders**



CIO 1193





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 1305 NEW YORK, NY

POSTAGE WILL BE PAID BY ADDRESSEE

**ATTN: Product Information Center**  
INFORMATION BUILDERS, INC.  
1250 Broadway  
New York, NY 10117-0582





# Rightsizing? Think Before You Leap.



## Information Builders And Sun Microsystems Give You Rightsizing Solutions With Minimum Risk.

Are you thinking about rightsizing but worried about accessing the data from your legacy systems? How do you make your hardware, operating systems and protocols appear as a single resource to your end users? And, how do you satisfy all these requirements in a client/server architecture?

### A PROACTIVE APPROACH TO RIGHTSIZING

Before you leap into Rightsizing, talk to Information Builders and Sun Microsystems. We understand the problems and the needs of companies facing these tough questions, and have been providing solutions to the Fortune 1000 for years.

Sun Microsystems, the world's leading supplier

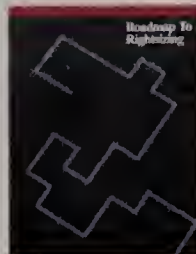
of UNIX workstations and servers, offers computing strategies that work with your existing systems. And, Information Builders has the software products, FOCUS and EDA/SQL, to help SPARCstation™, SPARCserver™ and SPARCcenter™ users implement productive open systems solutions.

FOCUS, the world's most widely installed 4GL, gives you the tools you need for client/server application development and decision support. EDA/SQL, the data access standard, provides access to all data on any platform.

With Information Builders and Sun, you can design a seamless migration strategy for a structured rightsizing plan—without a major disruption of your business.

### TAKE THE FIRST STEPS

To help you understand the challenges and rewards of rightsizing, the Hurwitz Consulting Group has prepared a white paper, "The Road to Rightsizing: Planning a Proactive Approach." It might be just the right thing to pull you back from the edge and put you in control of your rightsizing strategy. For your FREE copy...



CALL 800-969-INFO  
In Canada call 416 364 2760



**Sun Microsystems  
Computer Corporation**  
Catalyst Premier Developer

**Information  
Builders**



Even dead, they're trouble. ♦ Dr. Jack Horner will tell you that. He's the man whose research brought the monstrous dinosaurs back to life in the hit movie *Jurassic Park*. And more than once, he recalls, he nearly lost the fight. ♦ "How did dinosaurs run?" the Montana paleontologist asks. "How fast did they grow? How long did they live? We would have been short of answers without some very sophisticated statistical

IF ACCOUNTING CAN MAKE MINCE

MEAT

OF YOUR COMPUTERS

IMAGINE WHAT A TYRANNOSAURUS REX CAN DO.

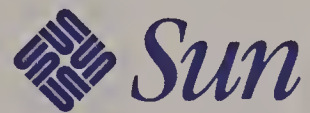
analyses and three-dimensional imaging." ♦ All of which pit the fearsome beasts against Sun™ workstations. ♦ Using images, Dr. Horner was able to envision the eyes, ears, nose, and brain structure of the long-extinct lizards. He







was also able to look at them three-dimensionally, right on the screen, from every conceivable angle, testing theory against fact. ♦ Using Sun, Dr. Horner was soon able to pin dinosaurs down, quantifying how well they could hear, even how they sounded. ♦ And what might a dinosaur say, should one meet you? ♦ Mostly, a kind of growling. ♦ “They weren’t very intelligent,” Horner says. ♦ But they were pretty hungry. ♦ Sun computers. Just the thing to handle a towering lizard, or whatever monstrous task you’re facing. © More than one million people are using Sun systems, powered by the SPARC® chip and the Solaris® operating environment, to gain a competitive advantage. Jack Horner is just one. To learn how you can benefit, call 1-800-426-5321, ext. 605.



**Sun Microsystems Computer Corporation**  
A Sun Microsystems, Inc. Business  
© 1993 Sun Microsystems, Inc.

**The Network Is The Computer™**





I am pleased to announce a new program that recognizes the achievements of information technology vendors—the *CIO* Readers' Choice Awards. These awards are based on a survey of *CIO* readers conducted earlier this year to determine preferred brands of PC/workstation products. The results of that survey are in, and I'm pleased to report the winners.

Congratulations to the winners! And many thanks to our readers who took the time to complete and return the survey.

| 1993 CIO Readers' Choice Awards: PCs/Workstations |        |      |     |     |
|---------------------------------------------------|--------|------|-----|-----|
| Product                                           | Compaq | Dell | IBM | Sun |
| <b>386-Based PCs</b>                              |        |      |     |     |
| Best Price/Performance                            |        | ✓    | ✓   |     |
| Leadership in Technology (Tie)                    | ✓      |      | ✓   |     |
| Best Return on Investment                         | ✓      |      | ✓   |     |
| Best Quality                                      |        |      | ✓   |     |
| Best Service/Support                              |        |      | ✓   |     |
| Consideration for Purchase                        |        |      | ✓   |     |
| Brand Awareness                                   |        |      |     |     |
| <b>486-Based PCs</b>                              |        |      |     |     |
| Best Price/Performance                            |        | ✓    |     |     |
| Leadership in Technology                          | ✓      | ✓    | ✓   |     |
| Best Return on Investment (Tie)                   | ✓      |      | ✓   |     |
| Best Quality                                      |        |      | ✓   |     |
| Best Service/Support                              |        |      | ✓   |     |
| Consideration for Purchase                        |        |      | ✓   |     |
| Brand Awareness                                   |        |      |     |     |
| <b>Notebook Computers</b>                         |        |      |     |     |
| Best Price/Performance                            | ✓      |      |     |     |
| Leadership in Technology                          | ✓      |      |     |     |
| Best Return on Investment                         | ✓      |      |     |     |
| Best Quality                                      |        |      |     | ✓   |
| Best Service/Support                              |        |      |     |     |
| Consideration for Purchase                        | ✓      |      |     |     |
| Brand Awareness                                   | ✓      |      |     |     |
| <b>Workstations</b>                               |        |      |     |     |
| Best Price/Performance                            |        |      |     | ✓   |
| Leadership in Technology                          |        |      |     | ✓   |
| Best Return on Investment                         |        |      | ✓   |     |
| Best Quality                                      |        |      | ✓   |     |
| Best Service/Support                              |        |      |     | ✓   |
| Consideration for Purchase                        |        |      |     | ✓   |
| Brand Awareness                                   |        |      |     |     |
| <b>Total Awards:</b>                              | 10     | 3    | 12  | 5   |

*Wesley L. Curry*

P.S. For more information on the Readers' Choice Awards, please call *CIO*'s marketing director, Cathy O'Leary Hayes, at 508 935-4521.

# Coming In CIO

## Learning the Hard Way

Taking a laissez-faire approach to managing the consultant relationship is great if you don't mind winding up with a system that bears no resemblance to what you asked for. The trick, veterans say, is to choose your consultant carefully, specify the requirements in detail, share responsibility and above all stay on top of the project. *CIO* examines the payback and pitfalls of enlisting outside expertise.

## Business First

"I am not focusing on programming. The main thing I'm trying to do is broaden their business understanding," says Geoffrey Relph of his reskilling efforts at GE Appliances. Unless IS can evolve from a group of technologists into business-technology hybrids, Relph fears it will become irrelevant. A panel of CIOs and consultants tells Relph what they think of his unconventional approach.

## A Stern Eye On Service

After years of blaming service companies' stagnant productivity growth on a "technology overdose," Stephen S. Roach, principal at Morgan Stanley & Co., is more optimistic. But despite his belief that stressing technology in productivity applications will improve competitiveness, he still has some unkind words for America's "managerial ineptitude."





ARDIS is two-way, wireless data communication. The freedom to communicate nationwide, from anywhere at anytime. The ability to communicate with computers and people, instantly. The power to communicate efficiently, to be more productive. The wireless data network from ARDIS. The only thing missing is the wire.



[ ARDIS. WHAT'S MISSING IS THE WIRE. ]

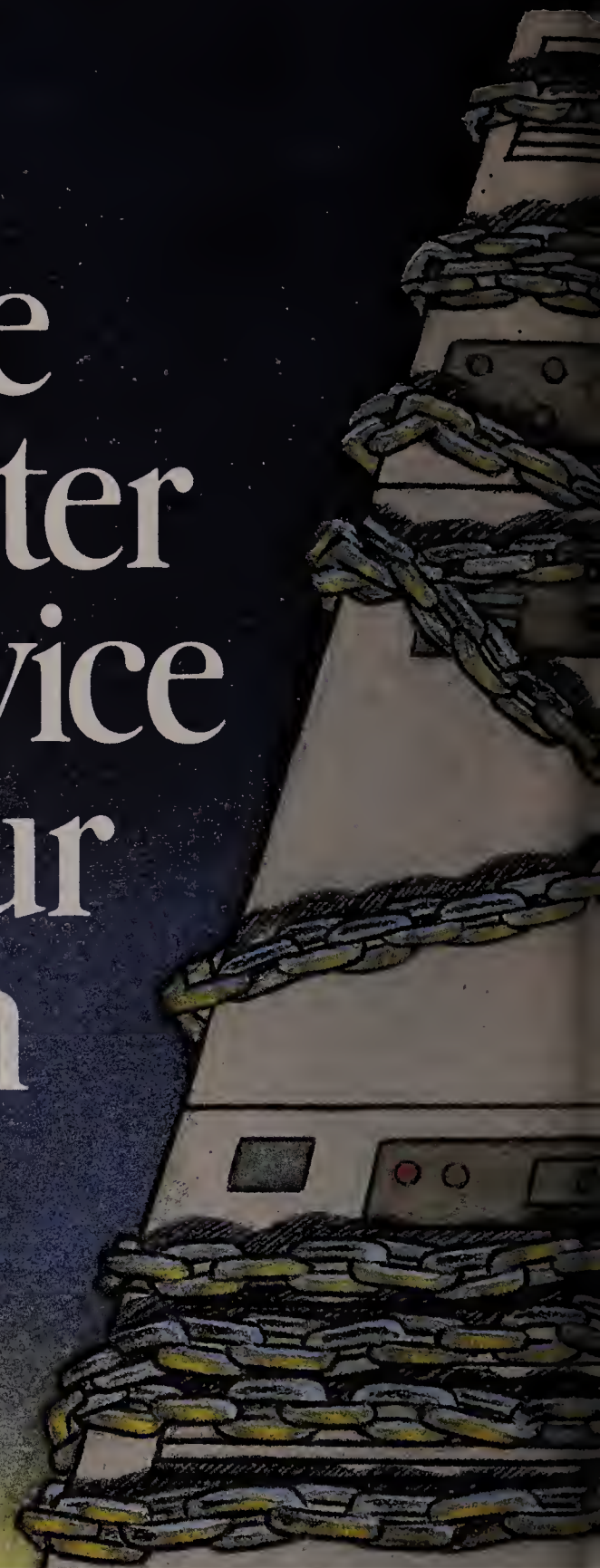
**ARDIS**

Real-time information solutions for  
real-life business problems.<sup>SM</sup>

1 - 8 0 0 - 6 6 2 - 5 3 2 8    E x t . 4 0 0



# Discover The Secrets Of Better Customer Service Locked in Your Information Systems.



## No One Offers Better Ways To Use The Customer

Improving customer service can be the biggest challenge facing your enterprise today. It's a task requiring information at a level of detail that conventional information systems can't effectively process. The detail data already exists in your enterprise. We can help you turn it into timely, useful information.

*"Our computerized production systems are enormous, but they don't answer, 'What's the trend of your data?' The answers were there, but we couldn't get to them. Now we can."*

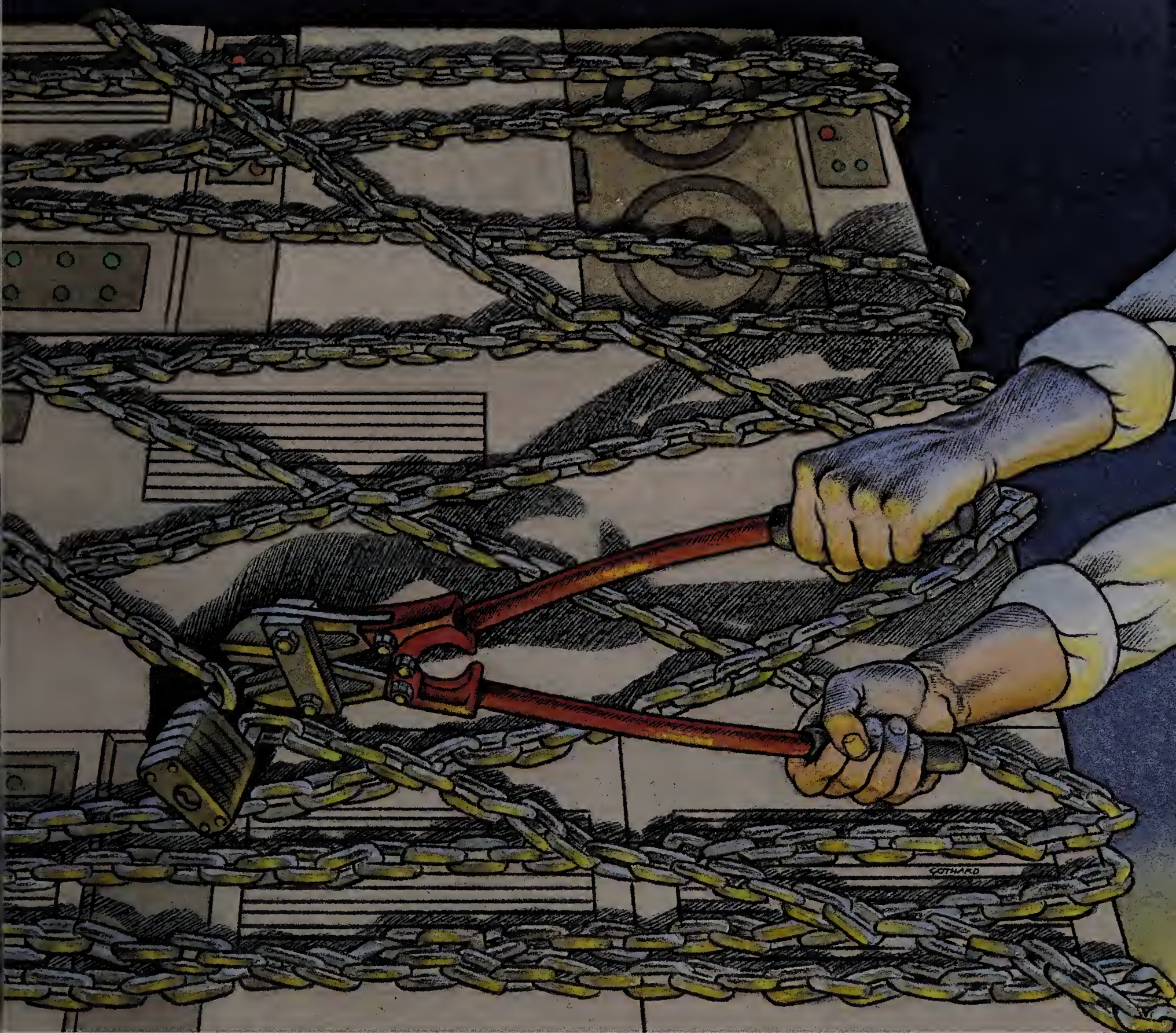
William Milnes, Jr.,  
Executive Vice President and CFO,  
Community Mutual

### THE BETTER YOU KNOW YOUR CUSTOMERS, THE BETTER YOU CAN SERVE THEM.

The unprecedented power of our massively parallel systems and global networking lets you extract the information you need from the data you have and move it to the people who can use it. This will help you understand and respond to your customers' needs in ways never before possible. By analyzing customer data, you can anticipate customer needs and satisfy them before your competitors do. You can







## ner Information Your Enterprise Already Has.

even reinvent your organization's customer contact for greater efficiency and return.

### **BETTER WAYS TO GET, MOVE, AND USE INFORMATION.**

No other company in the world offers so many solutions for capturing data and turning it into actionable information. From mobile PCs, through the world's broadest, most powerful family of mid-range servers, to massively-parallel processors.

And no other company can match our global expertise in communications and networking.

Once the information is generated, we can help you move it anywhere in the world, fast.

To improve your customer service, phone 1 800 CALL-NCR. We can help you unlock the secrets of a more profitable future.

NCR is the name and mark of NCR Corporation. AT&T and the AT&T globe design are registered service marks and trademarks of American Telephone and Telegraph Company. Intel and the Intel Inside Logo are registered trademarks of Intel Corporation. © 1993 NCR Corporation.



# TRENDLINES

## FUZZY LOGIC

### RISE AND SHINE

It's a matter of bumper-sticker wisdom that elevator operators have their ups and downs. But elevator-operation technology is definitely ascendant at the Otis Elevator Co. in Farmington, Conn., where recently patented fuzzy-logic dispatching software is expected to improve efficiency and give building managers new operational opportunities.

Until recently, designers of elevator-dispatcher systems—computer programs that deploy cars based on a series of preset rules—have relied largely on probability and heuristics (when something seems to make sense).

Their programs have had to provide yes or no answers to questions like, “should this car be assigned to this call?”—yet those responses have been derived from information that is often vague and incomplete.

Fuzzy logic—which more closely resembles the human than the digital variety—allows computers to deal with uncertainties and imprecise data, statements that are neither altogether true nor altogether false. It enables the microprocessors in Otis's computers to translate imprecise measurements, such as “moderately crowded” or “close,” into a form the systems can understand.

Say a passenger is waiting on the third floor for an elevator to take her to the lobby. Two elevators are available, a car on the seventh floor carrying five passen-

gers and an empty car on the 12th floor. Although the closer elevator would arrive sooner, dispatching that car would delay its passengers' arrival in the lobby.

Ordinarily, in evaluating how “crowded” or “close” the elevators are, the electronic control would use precise definitions, such as five passengers and four floors. Using fuzzy logic, however, the dispatcher system can assign *degrees* of “crowded” or “close” to elevators, thereby mak-

ing better assignment decisions and reducing waiting time—usually by about 15 percent, according to Otis's research.

Bruce Powell, principal research engineer at the Otis Engineering Center in Farmington, points out that elevator systems using fuzzy logic can be modified more easily when a building's occupancy changes. “Suppose there were a change from many small, independent tenants

to several large tenants, each occupying several floors,” he explains. “There would be more traffic between floors and less from the ground floors to specified floors throughout the building. A fuzzy-logic system can adapt with only minor modifications to the input data functions.”

The company's first fuzzy elevators are being installed in the 28-story Hyatt Regency Hotel in Osaka, Japan. ■

## FUN WITH WORDS

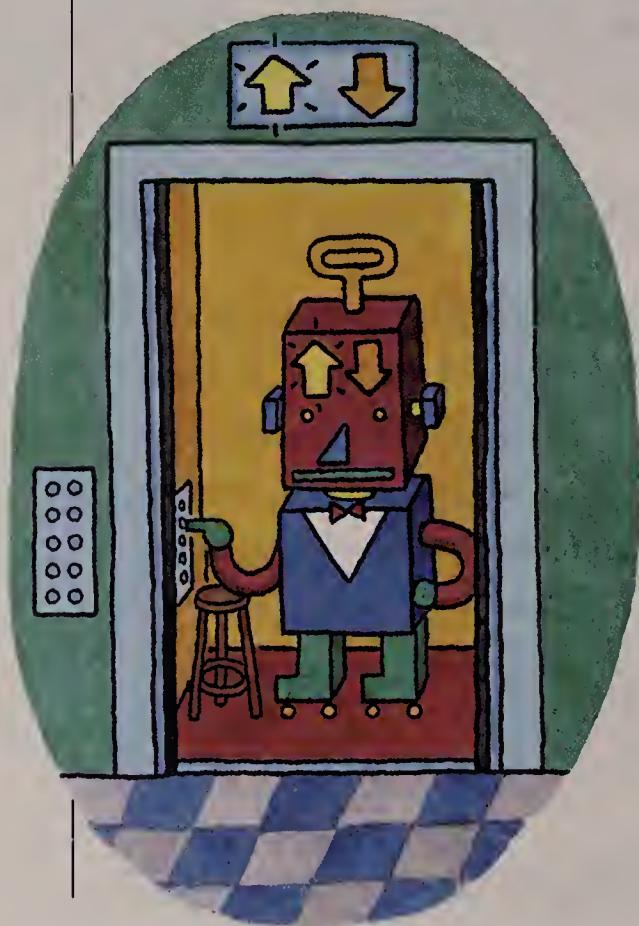
Some months ago we ran an article on reengineering (“Deconstructing the Status Quo,” *CIO*, June 15, 1993)

that used the word “kludginess” to imply an inelegant

structure that did not function properly. The author of the piece, Lew McCreary, was duly taken to task by Dwight Haworth, assistant professor of information systems at the University of Nebraska's College of Business Administration, for having misused the term.

According to Haworth, the word “kluge” derives from a German word, meaning “intelligent or clever,” that evidently has no negative connotation such as the one intended in the article. Haworth readily concedes that American usage has warped the original meaning in the direction of McCreary's intent (he quotes a microcomputer glossary that defines kluge as a “collection of poorly matching components assembled into a system”). But he contends that this pejorative usage is mistaken, having arisen perhaps from a cultural misunderstanding. When presented with complex Rube Golbergian solutions to simple problems, there are two possible reactions: An American finds weirdly klunky what a German admires as ingenious.

Makes sense to us. *CIO* stands by its mistake. ■





## "I'D LIKE TO KNOW HOW SYMBOL CAN CHANGE THE WAY MY BUSINESS WORKS."

Please send me more information on how Symbol can help me with the following:

- ☐ Manufacturing      ☐ Warehousing      ☐ Transportation/Distribution  
☐ Business Services      ☐ Retailing      ☐ Other (please specify) \_\_\_\_\_

Name \_\_\_\_\_ Title \_\_\_\_\_

Organization/Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Daytime Telephone No. (      ) \_\_\_\_\_

CIO



Changing the way your business works.





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 47 BOHEMIA, NY

POSTAGE WILL BE PAID BY ADDRESSEE



**SYMBOL TECHNOLOGIES, INC.**

Attn: Customer Information Center

116 Wilbur Place

Bohemia, NY 11716-9825





# DOES YOUR INVENTORY HAVE TROUBLE FINDING ITS WAY?



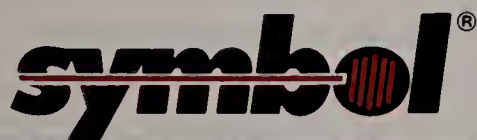
© 1992 Symbol Technologies

When faced with the challenge of inventory control, many companies don't know how to get from point A to point B.

The maze of issues confronting you can be overwhelming. Do you face excess inventory of items you don't need, or shortages of items you do need? Are you shipping items to destinations either too early, or too late? Are you able to identify in real time the location of materials in your warehouse or in transit?

Symbol Technologies, the worldwide leader in bar code data capture systems, has invented an innovative radio frequency technology that can help you in a way never before possible. Our Spectrum One® wireless network can help you manage inventory more efficiently and profitably, and better serve your customers.

To find out how Symbol's bar code data capture solutions can change the way your business works, call us today at 1-800-SCAN-234.



Changing the way business works.



# TRENDLINES



## MOVING RIGHT ALONG

Remember the International Summarize Proust Competition? That's the Monty Python sketch where teams vie to see how much of the plot of *Swann's Way* they can describe in one minute. One musical group spends so much time harmonizing that it never gets beyond "Proust in his first book wrote about...."

Well some meetings are like that. The speaker, with only 10 minutes to sell a new marketing campaign to senior management, spends

the first seven thanking his creative team and describing its methodology. By the time he's ready to explain the actual campaign, his audience is out the door and heading for the airport.

Pacesetter, from Interactive Solutions Inc. in Atlanta, is designed to help speakers and meeting leaders better control their presentations. Users program a countdown timer into one, two or three time periods. As each period (or presentation segment) elapses, Pacesetter alerts the speaker by flashing colored lights on a display that can be placed on the table or

podium. Or the product can be worn like a pager, vibrating when it is time to move on to the next subject.

Interactive Solutions is marketing the product as a tool for building speaker confidence and improving meeting efficiency and sales-call effectiveness. The price is \$95. For more information, call 404 343-8249. ■

## INTERNET APPLICATIONS

### SOME NEW FAX TO CONSIDER

If you're connected to the Internet, sending a fax may no longer require a trip to your local fax machine. Since July, the network has provided users with the ability to send fax messages—both text and graphics—to selected domestic and international destinations via E-mail. This new way of faxing is more convenient than traditional

methods—and usually cheaper because the Internet's transmission fees are lower than the cost of using long-distance telephone lines.

"Basically the setup involves a collection of computer sites around the world that provide access to a local telephone line that's connected to a fax modem on the computer," explains Marshall T. Rose, a communications consultant with Dover Beach Consulting in Mountain View, Calif., who helped develop the system. "Users send an E-mail message on the Internet, it is routed to the appropriate



server and then goes right out to the fax machine where it is printed out."

Users simply incorporate fax numbers into E-mail addresses. The Internet automatically identifies the server providing coverage to the designated area and notifies the sender whether the fax has been transmitted successfully.

The computer sites on the Internet that accept E-mail messages and turn them into faxes have volunteered to serve as gateways. To date, fax service is available for Japan, Australia, Ireland, the Netherlands and parts of the United States. Rose uses his own Sparc workstation to

## NO LAUGHING MATTER

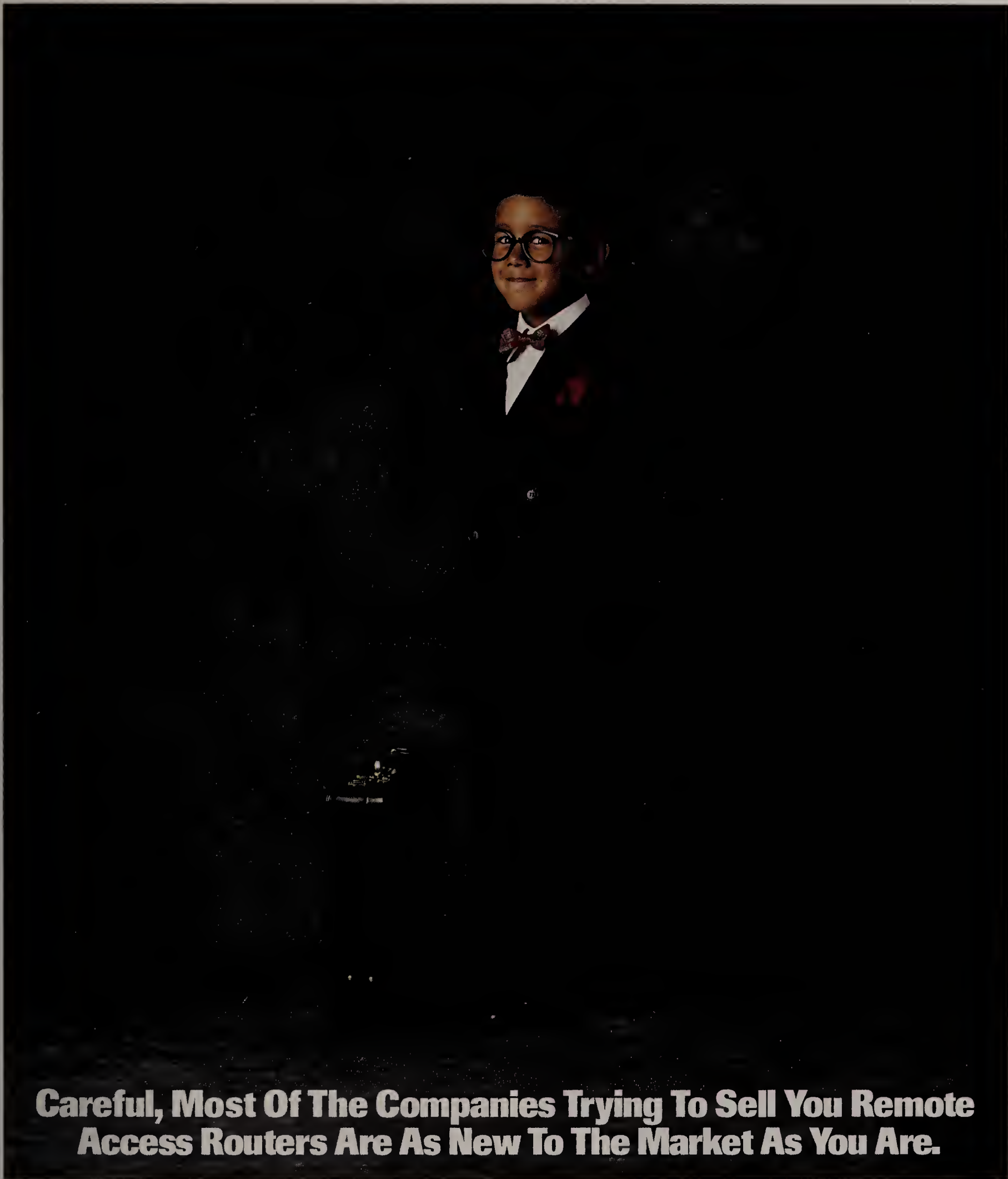
Integrated services digital network (ISDN) is a little like Ross Perot: For a long time it didn't get any respect, but now more people are starting to take it seriously.

ISDN will become the dial-up networking method of choice for mobile users and small offices by 1995, according to Forrester Research Inc. of Cambridge, Mass. "Dial-up networking has whet remote and mobile users' appetites for more, better and faster LAN access from afield," says Jay Batson, author of "Don't Laugh, It's ISDN," a recent report from

Forrester. "Unfortunately, users are quickly outpacing analog dial-up technology. Modems just don't deliver the same high-speed, trouble-free operations that users get on the LAN. ISDN does."

The Forrester report blames ISDN's ignominy on its slow, confused rollout, "during which no one knew whether it was for voice or data, or even whether they could buy it. Now deployment has reached a critical mass," says Batson, "and it's clear why people want it"—for dial-up data. ■





## Careful, Most Of The Companies Trying To Sell You Remote Access Routers Are As New To The Market As You Are.

Experience has taught us that a low price tag doesn't mean much if it comes at the expense of functionality and scalability. That's why Cisco guarantees access without compromise. Cisco's family of remote access products is designed to grow with your network and can be upgraded at any time. So we can meet your present and future needs. Just as importantly, Cisco lowers your total cost of ownership, with exclusive features like AutoInstall, for plug-and-play access. Dial-on-Demand routing. And CiscoWorks™, which allows centralized router management of all your remote sites, even if you have thousands of them. Find out why Cisco continues to be the leader in the router market. Call us at 1-800-859-2726 for a flexible, scalable internetworking solution. After all, there's no substitute for experience. **Access Without Compromise.™**



CISCO SYSTEMS



# TRENDLINES

provide coverage for the Silicon Valley area. "The cost of being a gateway is minimal," he says. "All that's needed is a computer with a fax modem, a telephone line, spooling software and fax software that's in the public domain." By selling ad space on the cover sheets of faxes, the entrepreneurially inclined can even operate gateways as a profit center.

Since the service was initiated, usage has been steadily increasing. "Every week we get more people to sign on as gateways," he says. "Hopefully we'll have enough to provide coverage throughout the country." For information on becoming a gateway, send an E-mail message to TPC-FAQ @ town.hull.org. ■

## MATTERS OF THE HEART

The workings of the heart have long perplexed poets and physicians. But now the latter are getting some help from information technology—specifically an expert

system that helps cardiologists diagnose coronary artery disease.

Perfex, developed by researchers at the Georgia Institute of Technology in Atlanta, interprets 3-D images that show how well blood is flowing through the heart. The images are obtained when doctors inject a tracer substance into a patient's bloodstream during exercise. Physicians then feed the system patient information, including sex, age, relevant health problems—particularly chest pains—and data gleaned from EKG tests. To aid decision-making, a graphical user interface displays textual, graphical and numerical information: For example, areas of dead muscle or low blood circulation are represented in black and areas of normal circulation in white.

Perfex then uses rule-based techniques grounded in years of medical research to offer a diagnosis or recommendation. So far, the system's findings have been highly consistent with those of human experts, according to Dr. Norberto Ezquerro, associate professor in Georgia Tech's College of Computing.

Perfex provides a suggestion or recommends conclusions regarding the presence or absence of coronary artery disease," Ezquerro says. "The system can help a novice or expert physician interpret all the information and justify the decisions that are being made. [It] can also be a teaching aid, helping

students understand diagnostic decision-making." ■

## NEW INKLINGS

He's blond, sports an eye patch and hangs 10 on a computer chip. His name is Morph, and he's the proprietor of an establishment known as Morph's Outpost on the Digital Frontier,

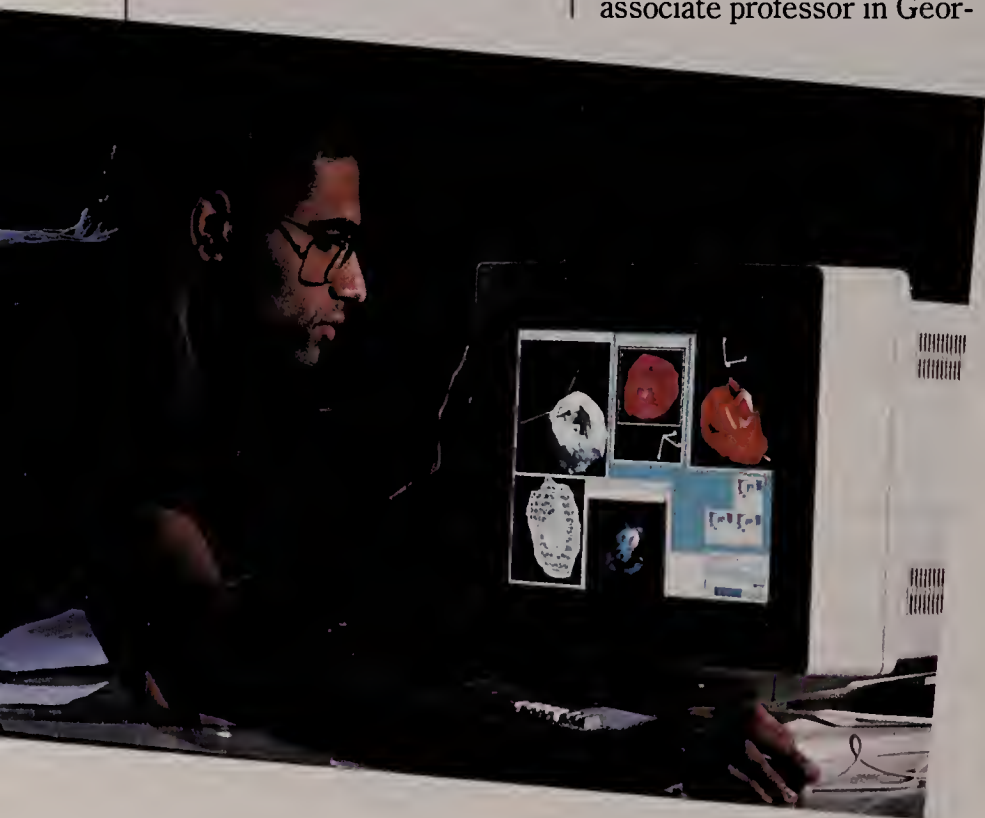
## WHERE THE MARKET-MINDED MEET

So you think Microsoft is still a good stock pick? Try convincing the Windy City Investment Club, a two-year-old national fraternity of stock-pickers with a \$20,000 portfolio. You don't have to drive to Chicago or anywhere else to make your point. Just fire off an E-mail message; the club

meets via the Prodigy online service 24 hours a day. Better yet, you can actually join the club, one of the country's first online stock-investment organizations.

The 30-member group can be found on Prodigy's Money Talk Electronic Bulletin Board under the topic of Stocks and Bonds. Casual board browsers can drop in on online stock critiques and debates. Or you can download posted in-depth stock reviews.

To join, you must contribute a minimum of \$50 per month toward the investment pool. (The club employs shareware that adheres to the National Association of Investors Corp.'s Stock Selection Guide.) Members share responsibility for suggesting stocks, researching companies, posting reports and voting on the picks. You might also suggest a cooler club name. The Knights of Capital Gains, maybe, or The Loyal Order of Dividends? ■







# Subscribe And Save.

~~\$78\*~~

**\$59**

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only \$59, a savings of over 24% off the basic rate.

Name

Title

Company

Address

City

State

Zip

The basic one-year  
subscription rate for  
*CIO* magazine is \$78.

*\*This is a domestic rate only (Canada & US). The foreign rate is \$175 US.*

AD93



**PROCESS  
IMMEDIATELY**



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

---

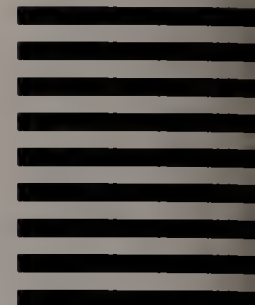
**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

---

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine  
Attn: Circulation Department  
P.O. Box 9208  
Framingham, MA 01701-9486





T H E   E N T E R P R I S E   N E T W O R K

## Pick your vision for open access.



**ALLINK** makes it a reality.

**O**PEN. LEGACY. PROPRIETARY. Now everyone wants to access the enterprise network. And with the ALLINK® Operations Coordinator, they can – while you manage all your network resources from a single point of control. What's more, it ensures you eliminate expensive redundancies so your network operations stay competitive as the enterprise grows.

Our support of standards-based open platforms, including Sun Microsystems' SunNet™ Manager and Hewlett-Packard's OpenView™, enables a level of SNMP control never before possible. Our intelligent interfaces to over 50 different element managers, such

as IBM's NetView™, provides you with true integrated management over the global enterprise network. You simply control events as the ALLINK Operations Coordinator anticipates and responds to them – without concern for platforms, vendors or protocols.

If this is your vision – integrated control over enterprise network platforms to stay competitive – there's only one system that can deliver it to you. The ALLINK Operations Coordinator from NYNEX ALLINK Company. Call us today at 1-800-848-8384 for complete product information and user reference data.

SunNet™ is a trademark of Sun Microsystems, Inc. OpenView™ is a trademark of Hewlett-Packard Company. NetView™ is a trademark of IBM Corporation.

**ALLINK**

**CONTROL without COMPROMISE**

NYNEX ALLINK COMPANY

4 GANNETT DRIVE



WHITE PLAINS, NEW YORK 10604

[914] 644 - 7750







# Information *of the* Third Kind

You've gained control of your transaction-based information through databases. And you've gained control of your office automation-based information through personal productivity tools. But there's a third type of information in your organization. And it's the most important. If left unmanaged, it could mean the difference between your success and failure.

We call this -- Information of the Third Kind.<sup>™</sup> It's the information that supports those business-critical processes necessary to achieving competitive advantage in the 1990's.

Interleaf Document Management Software is the enabling technology that can help you achieve this competitive advantage by assembling, controlling and disseminating Information of the Third Kind -- in user-friendly document form -- despite its growing complexity. Interleaf provides open solutions across all major platforms and in support of industry standards. To find out more, call 1.800.456.5323, extension 3.

Interleaf. We turn information into advantage.

The Interleaf logo consists of the word "Interleaf" in a white, serif typeface, centered within a solid black rectangular box.

## Interleaf

DOCUMENT MANAGEMENT SOFTWARE



# TRENDLINES

which is also the name of the first technical magazine for multimedia developers.

*Morph's Outpost* is a full-color, tabloid newspaper folded to the size of a regular magazine. It provides coverage of interactive multimedia tools and technologies, the theory behind their design, and step-by-step advice on how to create applications and titles for delivery on CD-ROM, kiosks, computer networks, interactive cable television, telephone ISDN and direct satellite-broadcast systems.

*Morph's Outpost on the Digital Frontier* claims that it is published by the virtual life form himself from a little wooden shack located where the electronic superhighway meets the jungle. It does, however have a mailing address in Orinda, Calif. A one-year subscription costs \$39.95. For information call 510 254-3145. ■

## WINDOWS ON THE WORLD

You can never be too rich or too well-informed. Unfortunately, businesspeople holed up in an office all day

often lose touch with breaking news until they switch on their car radios for the drive home.

Mainstream Newscast for Windows, a wireless, broadcast information service from Mainstream Data Inc., combats that problem by delivering real-time news right to the desktop. Using FM-radio and satellite technology, the product transforms Windows-based PCs into news terminals capable of simultaneously receiving, filtering and displaying news from multiple wire services.

Users can monitor business and general news from more than 20 information providers, including the Associated Press, Reuters, Business Wire and the Sports Network. News can be sorted into subject areas as broad as "stock market" or as narrow as "Bosnia."

The product has applications beyond satisfying the habits of news junkies. Among the company's suggestions: Marketing managers could create competitive profiles or monitor key customers and prospects, financial officers could track relevant tax legislation, and public-relations profession-

als could review coverage of their clients.

Newscast for Windows costs \$995, not including

subscriptions to the news wires, which begin at roughly \$30 a month. For information call 801 584-2800. ■

## EVENTS

### Managing Across Boundaries: Effective Cooperation in Technology

*The Waldorf-Astoria, New York*

November 16 and 17

*The Conference Board*  
212 759-0900

Executives share their experiences and strategies for successful management of internal and external alliances. The two-day seminar includes discussions of critical issues in managing technology sourcing and bridging business and corporate cultures abroad. Registration: \$885-\$1,065

### The Electronic Superhighway

*Sheraton Carlton, Washington*  
Dec. 1-3

*Business Research Publications Inc.*  
800 822-MEET or 202 842-3022

A two-day conference on the role of industry and government in encouraging telecom, computer and information infrastructures and networks. A preconference seminar will focus on emerging local-loop technologies and architectures. Registration: \$845-\$1,045

### Team-Based Rewards

*Parc Fifty Five Hotel, San Francisco*

Dec. 6-8

*International Quality & Productivity Center*  
800 882-8684

A two-day conference and

optional half-day workshop examine how leading organizations use team-based reward and recognition programs to dramatically increase productivity and profitability. Included will be presentations from American Express, Cigna, GE and others. Registration: \$1,095

### Wireless Datacomm '93 Fall

*Sheraton Washington Hotel, Washington*

Dec. 6-8

*Business Communications Review*  
800 322-WDEC or 203 847-5131

A forum where representatives of the wireless-data industry can explore marketplace issues and buy and sell products. Included will be a series of in-depth tutorials and more than 35 conference sessions covering timely marketing, technology and application issues. Registration: \$495-\$1,095

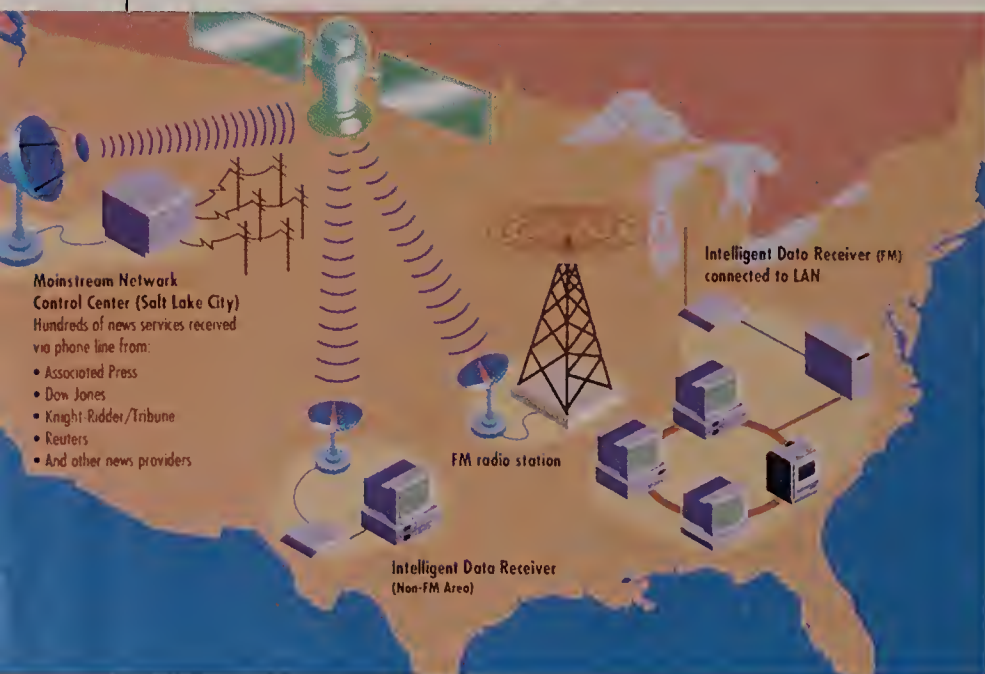
### The Outsourcing Conference

*Westin Hotel, Copley Place, Boston*

Dec. 8 and 9

*DCI*  
508 470-3880

This conference explores the growing outsourcing arena and teaches participants how to negotiate successful outsourcing contracts. Outsourcing veterans will share their stories. Registration: \$995







Coming through with the right stuff to solve a problem. That's what we did for one of the world's leading distributors of animal health pharmaceuticals when they needed the most effi-

**SYNTEX ANIMAL HEALTH**  
a division of  
**SYNTEX AGRIBUSINESS, INC.**  
A SYNTEX COMPANY.

With \$2 billion in sales, SYNTEX is a worldwide leader in human pharmaceuticals and animal health products.

**CHALLENGE**

To develop an inventory management system that could track product from incoming raw materials to final customer distribution.

**SOLUTION**

Daly & Wolcott's  
A+ Application Plus® Warehouse Management, Customer Service, Inventory Management and Financial Reporting Software solutions.



“Lots of companies sell distribution software. Only one helped us manage our entire distribution cycle, tracking product all the way to the end user.”

Bonnie Rosa,  
Manager of Information Systems,  
Syntex Animal Health

cient way to produce and distribute a new feed additive for cattle. Tracking serial numbers, lot numbers and expiration dates all the way to the end user.

The solution: The Daly & Wolcott partnership of people, technology and ideas. We responded with a fully integrated AS/400 software solution that was up and running in no time.

Since 1977, Daly & Wolcott has been helping companies like Syntex Animal Health reach their distribution and customer service

goals. We listen, understand, and respond with fully functional and completely integrated AS/400 software solutions linked to a team of support, development, service and training professionals working together to make it all happen. That's why as an IBM Strategic Business Partner, we've earned one of the industry's highest ratings. Our A+ Application Plus software is intelligently designed to manage your



financials, inventory, warehouse logistics and customer service. Our service team provides unparalleled support, while development keeps an eye on your future with continuous product enhancements.

To find out more about how we've helped other companies just like yours, call Daly & Wolcott at **1-800-343-2414**. We'll put the partnership to work for you.

**Daly & Wolcott**   
The partnership works for you.



MANAGING THE TOTAL DISTRIBUTION FUNCTION  
OF TODAY'S GLOBAL BUSINESS





# It's Easy Being Green

A new EPA program is helping organizations cut costs and air pollution through energy-efficient computing

BY BRIAN JOHNSON  
AND LINDA LATHAM

To anyone who follows the news, business and environmental interests may often seem diametrically opposed. The timber industry vilifies friends of the spotted owl, irate salmon fishermen in Alaska block the paths of oil tankers, and farmers gnash their teeth as fees rise on their grazing lands. But there exist a number of areas where what is good for the earth is also good for the bottom line. And information executives are in an excellent position to save their organizations some money and promote their image as good corporate citizens into the bargain.

Heavy promotion of corporate recycling programs has brought home to businesses the fact that paper usage contributes to pollution. Replacing paper with electronic communications is a boon for the environment, as well as for efficiency and productivity. Using computers for intraoffice messaging—via E-mail or bulletin boards—or to communicate with customers and suppliers—via MCI Mail, for example—makes environmental as well as business sense.

But automation is no panacea, and the paperless office has its downsides. According to the Environmental Protection Agency (EPA), office equipment contributes the fastest-growing electricity load in the commercial sector. Computer systems alone account for 5 percent of commercial electricity consumption—and that figure may rise to 10 percent by the year 2000. In order to create all that electricity, utilities must burn coal, oil and other fossil fuels; this combustion in turn pollutes the air through emissions of sulfur, carbon dioxide and other such substances.

Corporations can reduce the amount of electricity they consume—and consequently their electric bills—simply by asking employees to turn off their computers when not in use. EPA research shows that the nation's 30 million to 35 million PCs are not in use most of the time they are turned on, and 30 to 40 percent are left running at night and on weekends. The annual cost of running a computer, monitor and laser printer all day and night is \$165 (235 watts at 8 cents per kilowatt hour). Merely switching off the systems at night would save user companies \$126 per PC each year.

Information executives are in a strong position to encourage corporate-wide energy efficiency. IS executives can work with corporate environment departments to create fact sheets and posters urging responsible computer use, issue notices over the network reminding people to turn off their computers and promote telecommuting—which reduces air pollution by taking cars off the road.

But enforcing such policies on a day-to-day basis is difficult—especially for corporations with thousands of PCs. In response to these



ILLUSTRATION BY HAL MAYFORTH





# The Key To Integrating Your Network And Business Objectives Is An Open View.



Managing your network is managing your business. The key to success is clear vision with an open point of view. Because achieving your objectives requires making all kinds of things work well together.

The Racal Management System does just that. It is now integrated with HP's OpenView® platform (and we still interface with IBM® NetView™), so more companies than ever can move up to integrated network management.

**YES. WE'RE  
OPEN**

Easily tailored, the Racal Management System is capable of managing the widest array of devices in the industry (including Racal's 350 products). Fact is, it's one of the best overall solutions for integrated management challenges. And when it comes to integrating legacy systems and devices into a common management environment, our Multivendor Integration ToolKit makes a difficult task simple and more affordable.

No wonder *Communications Week's* comprehensive 1993 SNMP Managers test series ranked the Racal Management System "a topnotch management platform" and praised "the degree to which the management of WAN equipment and facilities has been integrated with the system."

Look into network management with an open view. Call 1-800-RACAL-55 for a free information package about integrating your business and network objectives. It's a real eye-opener.

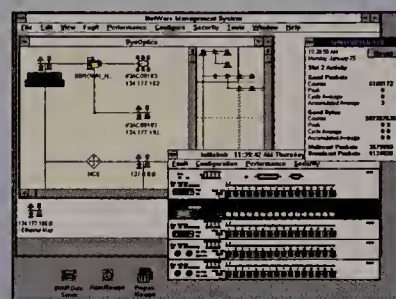
**RACAL**



# Clean up

Network management can get messy —especially when you have multiple environments. Fortunately, the people who helped you build your network have a cleaner way to manage it all.

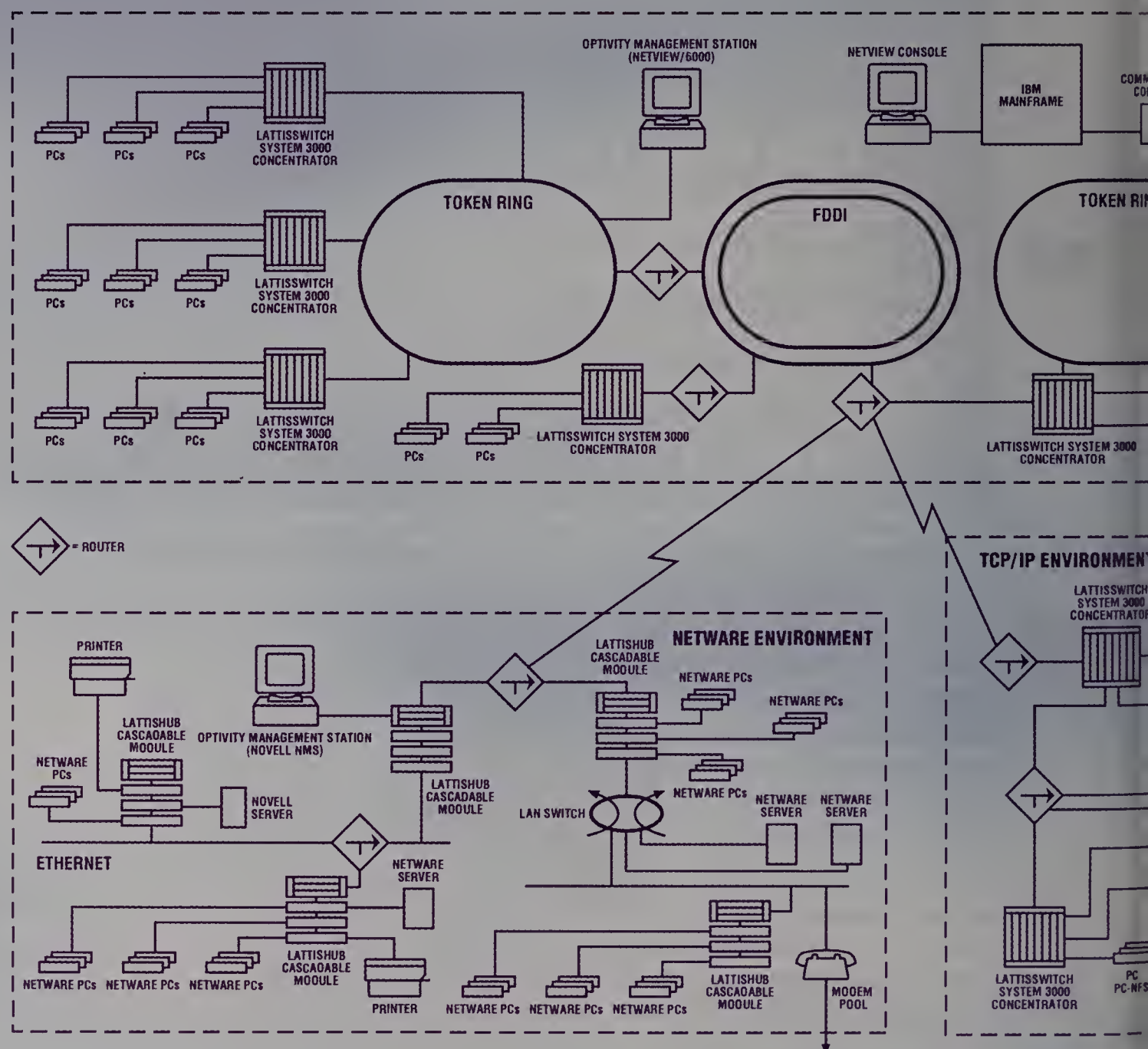
SynOptics is a natural choice for network management. We not only pioneered the intelligent hub, but we were the first to provide integrated SNMP management in Ethernet, Token Ring and FDDI networks. As a result, we've become



*SynOptics' Optivity™ network management system is integrated with all the leading open management platforms.*

the hub of network management for over six million users worldwide.

With SynOptics, your whole approach to network management is cleaner. Our Optivity™ and LattisWare™ software solutions support all major network technologies, as well as emerging ones like ATM. Be it SNA™, NetWare®, TCP/IP, or a mix of all three, our customized solutions handle it all. For example, we've integrated Optivity and LattisWare with all the leading





# Want to see more?

To receive more information about our cleaner approach to network management, simply complete this card and drop it in the mail.

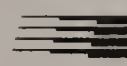
Name \_\_\_\_\_

Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City/State/Zip \_\_\_\_\_ Telephone \_\_\_\_\_

 **SynOptics**

MA9307B-CIO





NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES



**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 1038 ANNAPOLIS, MD

POSTAGE WILL BE PAID BY ADDRESSEE



SynOptics Communications, Inc.  
c/o TeleSpectrum  
Suite 100  
190 Admiral Cochrane Drive  
Annapolis, MD 21401-9675





# your act.

open management platforms: HP OpenView,<sup>TM</sup> IBM NetView<sup>®</sup>/6000, Novell<sup>®</sup> NetWare Management System<sup>TM</sup> and SunNet Manager.<sup>TM</sup>

We view your network as a whole, not as individual technologies. And we've designed a management architecture that's flexible enough to grow as your network does, protecting your investment. The Optivity network management system will meet your needs today, and down the road.

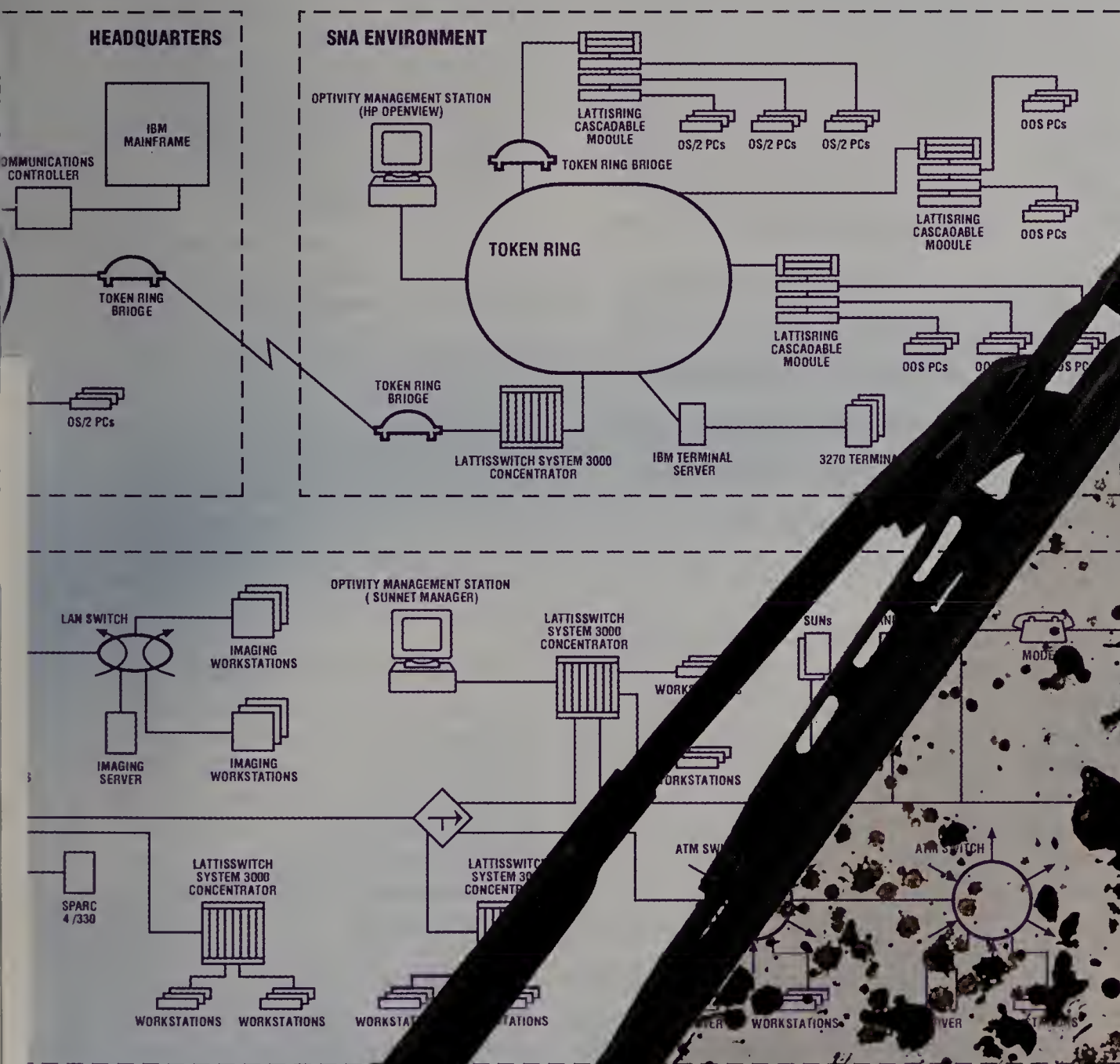
It's all part of our commitment to the network fabric, a managed, high-speed communications

system that supports new classes of enterprise and multi-enterprise applications. The network fabric expands and evolves as your business grows.

Now, if things are still a little muddy, just call 1-800-PRO-NTWK, ext. 12 or return the attached card for more information. We'll be happy to clear up any questions you may have.

**SynOptics**

The Network Fabric of Computing





concerns, the EPA has joined with vendors of PCs, printers and monitors in an effort to populate desktops nationwide with energy-smart computers. Vendors participating in the EPA's Energy Star Computers Program have voluntarily pledged to develop and market PCs, monitors and printers that enter a low-power standby state when not in use. Representatives from several major manufacturers worked with EPA employees to draw up specifications for the low-power state; compliant products, which are just beginning to come on the market, bear the Energy Star logo.

Initially the EPA actively solicited vendor participation. The response has been enthusiastic, and now interested vendor companies call every day on their own initiative. Vendors involved in the program currently represent about 80 percent of the PC, monitor and printer market and include most of the major manufacturers. Apple Computer, Dell, Digital Equipment, IBM, Sun Microsystems, Compaq Computer and Hewlett-Packard are among those already offering qualifying products. In addition, more than 60 software and component companies, including Microsoft, Intel, Advanced Micro Devices and Texas Instruments, have registered as Energy Star Allies (the ally agreement does not contain individual product specifications, so no products are "compliant").

Now that so many manufacturers have signed on, the EPA is turning its attention to the user community. The agency hopes in the near future to be able to help companies interested in buying Energy Star computers and printers find qualifying products and quantify the resulting savings, making the investment in new equipment an easier sell to top management. The EPA also plans to provide companies with materials they can use to publicize their public service to stockholders and the public. (This type of support proved popular with participants in the agency's Green Light Program, which promoted energy-efficient lighting use.)

In addition, the General Services

Administration is putting together a computer bulletin board that federal purchasing managers can use to find out about Energy Star products that meet their particular requirements. The EPA hopes to download that information and make it available to interested organizations in the private sector.

**T**he benefits of procuring Energy Star computers and printers are clear. Energy-conscious computing requires no sacrifice from the user—Energy Star manufacturers say their products will be comparable to less-energy-efficient models in both price and performance. And qualifying products offer a tremen-

---

**Vendors participating in  
the EPA's Energy Star  
Computers Program have  
voluntarily pledged to  
develop and market PCs,  
monitors and printers  
that enter a low-power  
standby state when  
not in use.**

---

dous payback, both to the environment and the bottom line. The EPA estimates that, once Energy Star products predominate in the market (by the year 2000), their use will save enough electricity each year to power Maine, New Hampshire and Vermont. At the same time, carbon dioxide pollution will decrease by the equivalent of the emissions from 5 million cars.

More important for IS executives—who must make sound technology decisions while simultaneously cutting costs—the EPA estimates that U.S. companies can cut their electric bills by \$2 billion a year by incorporating Energy Star computers in their technology plans. President Clinton,

in announcing that all federal agencies will now be required to buy Energy Star-compliant products, provided they are commercially available, said the order would save taxpayers \$40 million annually. (The U.S. government is the largest buyer of computers in the world.)

Companies may also discover some unexpected financial benefits from buying Energy Star products. For example, energy-efficient computers produce considerably less heat because they are "asleep" part of the time. A company that uses all Energy Star computers—especially in combination with buildingwide energy-efficient lighting upgrades—will likely be able to cut cooling costs. In some cases, companies may be able to replace air-conditioning systems with smaller, more-efficient models to further reduce annual operating expenses.

Some organizations may worry about compatibility issues, or that committing themselves to compliant products might limit their future options. But Energy Star computers present no real risks. The EPA is predicting that Energy Star computers will be the standard on the market by 1994 or '95, and that by the end of the decade, the vast majority of desktop computers operating in this country will be compliant. In fact, it will eventually become much harder to buy products that are *not* Energy Star compliant than those that are.

"The creation of energy-efficient computers for the marketplace is a landmark in the development of environmental technologies," Vice President Al Gore said when the first Energy Star products were unveiled. "They show how economic development and environmental protection go hand in hand." ☐

---

*Brian Johnson and Linda Latham are, respectively, the past and current program managers of the Environmental Protection Agency's Energy Star Computers Program. For more information, or to obtain procurement language, call the Energy Star Computers Information Line at 202 233-9114.*





## Only Bell Atlantic offers three ways to shorten the distance between you and future ATM technology.

You might think that Asynchronous Transfer Mode (ATM) technology is too far off for your company to focus on today. But you can get many ATM-like high-speed, cost-saving benefits in your data communications *right now*—with Bell Atlantic\* fast packet services. And because we're the only one in the region to offer you all three services, we can create a "hybrid" solution for your needs.

### SMDS

Switched Multimegabit Data Service extends the performance of LANs over a wide area with public, packet-switched, high-speed (1.17 to 34 Mbps) transmissions.

### Frame Relay

A data communications service that provides high throughput and low delay for intra-enterprise, high-speed (yet bursty) applications.

### FDDI Network Services

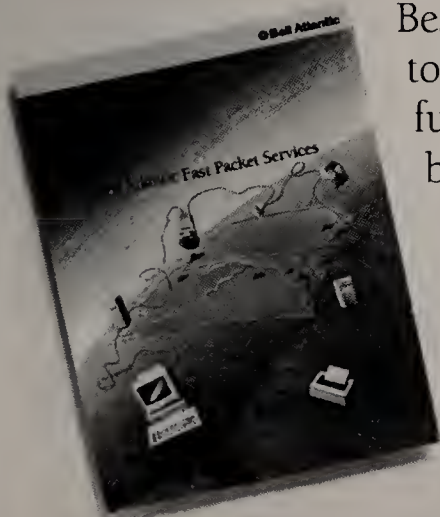
An all-fiber network that delivers a native LAN speed interface (4, 10 and 16 Mbps) to your LANs via a shared 100 Mbps FDDI backbone.

Best of all, these services are migratable to ATM, so you'll be better positioned for tomorrow. Look into how Bell Atlantic fast packet services can bring you closer to future ATM technology. Call 1 800 422-0455 today and ask for our fast packet brochure that details what each service can do for you.

\*The Bell Atlantic family of companies includes the Bell Atlantic Systems Group, Bell of Pennsylvania, the C&P Telephone companies, Diamond State Telephone, New Jersey Bell and other communications and information management companies. Bell Atlantic fast packet services are not yet tariffed in New Jersey and West Virginia.

**Call 1 800 422-0455**

** Bell Atlantic**





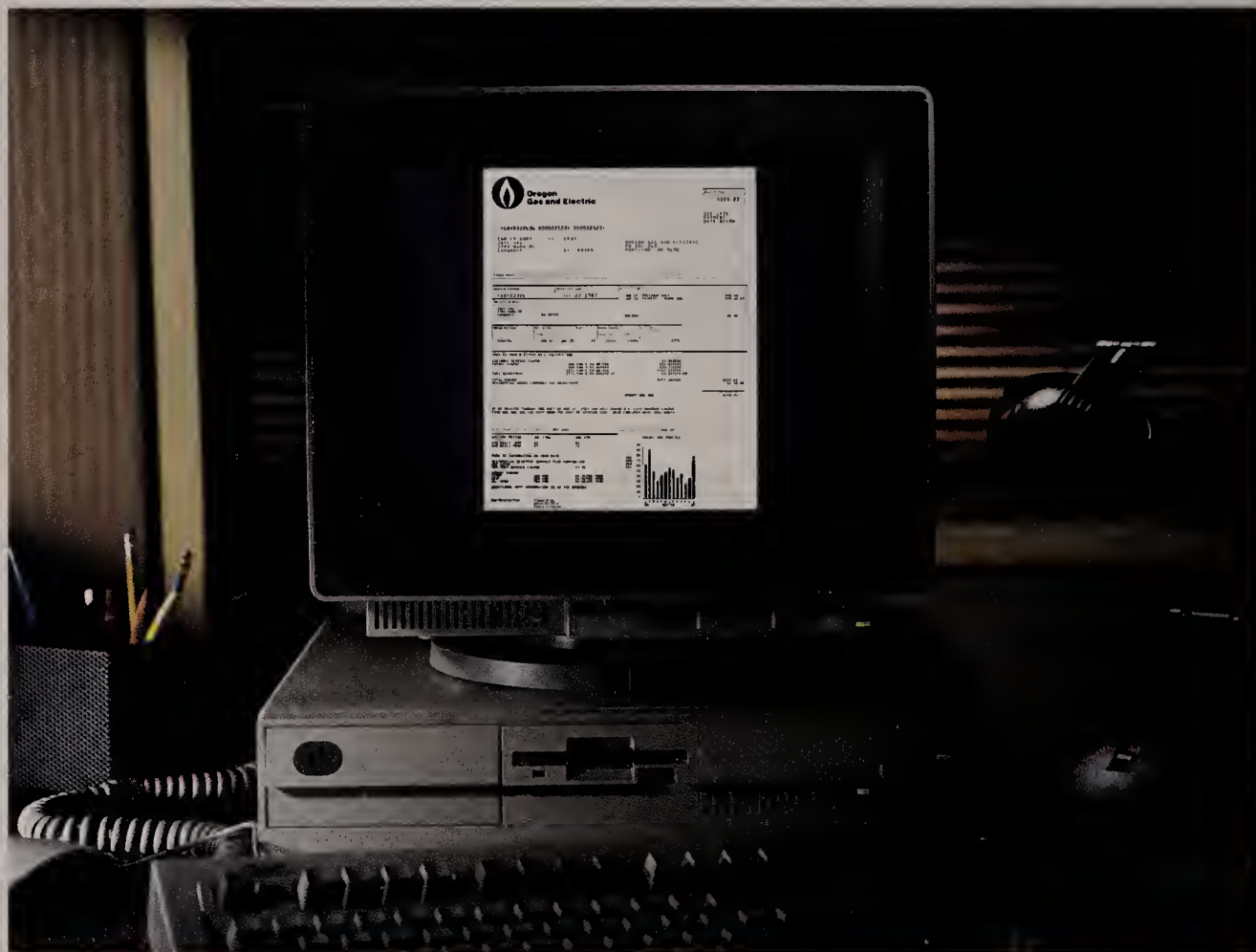
Why on Earth is a printer company thinking about the paperless workplace?

Because, at Pennant Systems, we've redefined printing to mean much more than making impressions on a page. Printing is the *presentation* of information anywhere you want it, and in whatever form you need it.

Pennant, an IBM Company, offers a full range of advanced printers and software systems and services that help manage the way information flows through your entire organization.

If you have printers and display systems in place, even many different brands, we can integrate them efficiently as well.

**IN THE FUTURE, PAPER WILL ONLY  
BE STORED IN TWO PLACES.**





That's why Pennant is not just a printer company. You see, we are a *presentation* company.

Printing hard copies may not be as necessary in the future as it is now, which is good news for forests. But getting information presented to you instantly, and in any form is already an essential way to do business.

A Pennant representative would be more than

happy to talk to you about your company's information presentation needs. Save a little paper and call us at 1-800 PENNANT for information on our printers, software, maintenance, and other services.

Your company, your customers, and your forests will thank you.



Redefining Printing.<sup>SM</sup>  
**PENNANT**  
An IBM Company



# • **SOME** • Simulating **EXPERIENCES**

Using computer-aided simulation, companies are taking a little mystery out of life—and a lot of the risk

**QUIZ QUESTION:** NAME A TECHNOLOGY THAT can prevent costly mistakes both in business-process reengineering (BPR) and in designing client/server applications. Stuck? Here's a hint: This technology can also predict assembly-line bottlenecks, your competitor's next strategic move and whether the downsizing your company plans will really save money.

Still stuck? OK, here's your last clue: You can use this same technology to modify employees' on-the-job attitudes and decision-making behavior, and to solidify skills learned in training programs.

Bzzzzzz. Sorry, time's up. The answer is computer-aided simulation, and it's being used at a broad range of companies for a surprising variety of purposes. At Whirlpool Corp. in

Evansville, Ind., for example, a team headed by industrial engineer Alan Wood built a simulated assembly line using Siman, a simulation programming language from Systems Modeling Corp. of Sewickley, Pa. With the program, "we were able to run some experiments and find out where the problems would be before we were actually down there on the plant floor," Wood says.

BY MICKEY WILLIAMSON







You call it Wreck  
We call it Re





# Yes, I'd like a copy of Answers to Business Process Reengineering questions.

A00203N3

We are studying the impact of Business Process Reengineering and may want training in: ☐ 0-6 mos, ☐ 6-12 mos, ☐ 12 mos +, ☐ Unsure

NAME \_\_\_\_\_

TITLE \_\_\_\_\_

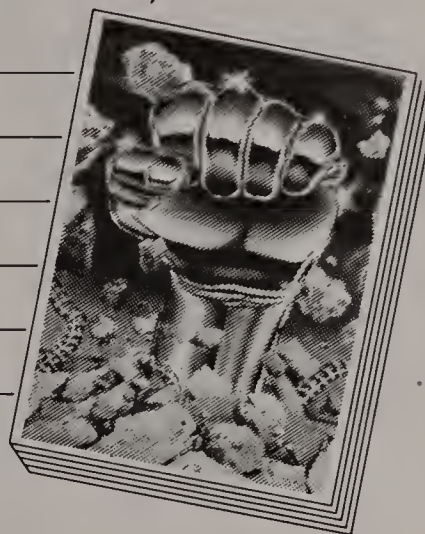
COMPANY \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_

Or for faster service call 1-800-457-6993







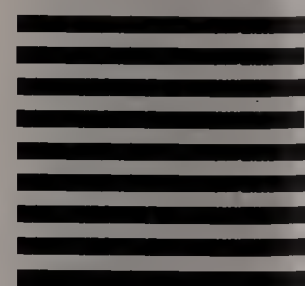
NO POSTAGE  
NECESSARY  
IF MAILED IN THE  
UNITED STATES

**BUSINESS REPLY MAIL**

FIRST CLASS PERMIT NO. 434 NAPERVILLE, IL

POSTAGE WILL BE PAID BY ADDRESSEE

Attn Marketing Services  
National Education Training Group  
1751 W Diehl Road  
Naperville IL 60563-9881





# and Rebuild. engineering.

## **EITHER WAY, BUSINESS PROCESS REENGINEERING CREATES A STEEP LEARNING CURVE**

50% to 70% of all reengineering efforts fail. Why? Because senior management often needs more information on the commitment required to implement Business Process Reengineering (BPR)... and IT staff requires specific skills to enhance the productivity of technology users.

When you're reengineering business processes (not to be confused with software reengineering), technology plays a central role... as evidenced by widespread downsizing, client/server, GUI training and other IT disciplines that support reengineering.

For many organizations the quality of training will determine whether or not reengineering succeeds.

## **NETG HAS THE BLUEPRINTS TO HELP YOU REBUILD**

The NETG mission is to provide professionals with the training solutions required for effective reengineering. Exposure to our professional education and training solutions can dramatically increase your chances for success. Courses range from hands-on, skills-based training, to courses which build awareness or provide a theoretical understanding of today's business developments.

## **NETG—PROVIDING TRAINING SOLUTIONS FOR OVER 25 YEARS**

As the world's largest resource for training and education, we're not above the need for reengineering ourselves. Recent key business partnerships and co-development agreements with leading industry experts have significantly increased the variety of solutions we offer.

We have training for the most sought-after technologies. Our courses are there when you need them, can be designed to fit specific needs, and will increase your productivity.

### **A SAMPLING OF BPR COURSES**

- Leading Teams
- The Deming Library
- Business Process Reengineering
- Using IT to Reengineer Business Processes
- A Business Process Reengineering Methodology: IDEF

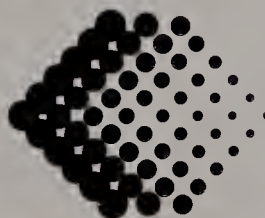


### **FOR THE ANSWERS, JUST ASK**

NETG is your largest single source for education and training. For more information on Business Process Reengineering please mail the attached card, call for our ANSWERS brochure at 1-800-457-6993, or write: National Education Training Group, Inc., Attn: Marketing Dept., 1751 West Diehl Road, Naperville, IL 60563-9099.

**Call 1-800-457-6993**

A00203N3



**NETG®**

RESKILLING FOR  
REENGINEERING



Siman let the Whirlpool engineers identify potential bottlenecks, fine-tune conveyor-belt speeds and experiment with different production schedules.

What's more, the simulation showed that Whirlpool could do something engineers had long considered impossible: build different product models at the same time. Conventional assembly lines run in batch mode, Wood explains. "We might run one kind of refrigerator for two days, then change the whole line over and run three days of a different model." In pursuit of flexibility, Wood ran a simulation in which four different models came off the same assembly line. "We didn't know whether that was feasible, and [the simulation] showed that it was," he says.

Manufacturing simulations are hardly new, although the ability to watch the simulations run as animat-

ed images is. To demonstrate the simulation's results to nontechnical managers, Wood used Siman's animation feature to show how the refrigerators—represented by four different-colored boxes—move through the assembly line. "Typically what you get out of the simulation is just numbers," Wood says. But he didn't want to approach management with stacks of computer printouts. "I wanted to take something to my division VP that would let him see what was actually going on."

**R**UNNING AN ASSEMBLY line is just one kind of business process that simulation software can help streamline. The Continuum Co., an Austin, Texas-based supplier of software and services to the financial industry, uses simulation to help insurance companies reconfigure the flow of paperwork, a crucial aspect of

BPR. "Queuing problems [manufacturing vernacular for bottlenecks] turn out to be a big issue in business workflows," says George Hardy, director of performance and data architecture. "It helps to have a simulation tool actually calculate queuing problems," he adds.

Continuum consultants used SES Workbench from Scientific and Engineering Software Inc., also of Austin, in a BPR engagement to study workflow among 14 people in a particular business area. The first step, Hardy says, was to model the existing process, estimating the timing of individual steps until the model predicted what was actually taking place. "By doing that, you have some level of confidence that the components [of the simulation] are reasonably close to reality," says Hardy. "Having done that, [the consultants] messed around with the business workflow."

**IT'S BUILT ON A FOUNDATION OF OVER 1,000,000**

**CAN'T**



Simulation models provide "more-interesting information than just the start-to-end-point response time," Hardy explains. "They can graph out how much traffic is in various queues and how much delay and productive time there is in different places." For example, it turned out that the biggest bottleneck in this particular business area occurred in the mail room, so the consultants tried assigning more and more people to that site. "That moved the problem around, but it turned out that the solution was not to put so much paper through the mail room," Hardy says.

By retraining employees to perform more than one function at a time, the insurance company reduced the time it took a document to pass through this business process from between seven and 10 days to less than one day, "with the same number of people and the same skill

**THE SIMULATION  
SHOWED THAT  
WHIRLPOOL COULD  
DO SOMETHING  
ENGINEERS HAD  
LONG CONSIDERED  
IMPOSSIBLE: BUILD  
DIFFERENT  
PRODUCT MODELS  
AT THE SAME  
TIME.**

set," Hardy reports. Without the simulation, consultants would have had nothing more solid on which to base their recommendations than

the intuition born of experience. Simulating the renovated process reduced the risk that intuition might prove them wrong, Hardy adds.

Where experience is lacking, simulation can often take its place. One such area is in the design of client/server applications—particularly the knotty part where software engineers decide what part of the application should run on the client and what should be on the server. "Businesses are appropriately nervous about client/server technology because there are a tremendous number of unknowns," Hardy says. Mainframe systems have comparatively few variables, and developers with 20 years of experience and good track records are not hard to find. "You could call them in and go ahead with confidence, but you can't do that with client/server, because it hasn't been around that long," he explains.

**LICENSED USERS AND 8,000 32-BIT APPLICATIONS.**

**BRENT!**



Continuum developers simulated the performance of its workflow-management product, Business Process Manager, which incorporates an object-oriented database and a rules-based knowledge system. It expected to find a bottleneck at the computer's central processor where reasoning was taking place. Instead, the simulation revealed that the real problem lay with the capacity of a tiny utility used to move data around the system—"not the knowledge-based system, not the object-oriented database, not the network itself. That led us to pay more attention to how we used [the utility]," Hardy says.

**I**F SIMULATION CAN PREDICT the performance of client/server applications, it can also forecast the behavior of entire markets and economies. "Simulation is really nothing more than

looking ahead. People do that in their heads every day," says Stephen Maloney, president of Devonrue Ltd., a business-strategy consulting firm in Boston. But computer simulations are different in two fundamental ways. "They take advantage of all the information available, and by doing it in a structured way they ensure consistency and traceability of the forecast," Maloney says.

Strategic plans are based on assumptions, and assumptions are based on experience, he explains. "I have a set of assumptions, and you have a set of assumptions, and we can spend a lot of time arguing the basis for the differences in our views. A lot of what management is about is having endless meetings trying to reconcile assumptions."

Simulation expedites the process by allowing people to review and document assumptions and what they mean in terms of actions, Mal-

oney continues. "The big advantage is that you are able to understand the basis for people's opinions."

To people who see simulation as "an oracle-like forecast of how the world will be," Maloney says it is "more a vehicle for identifying the very different ways [in which] the world can turn out, providing a common basis for communication." Using a mixture of econometric models, various statistics going back in weekly increments as far as 10 years, competitive and market profiles, and descriptions of human and organizational behavior, Devonrue, which focuses on capital-intensive enterprises such as those in telecommunications, runs through every conceivable scenario to assess probable outcomes of things such as contemplated capital investments, acquisitions and pricing structures.

Most companies use spreadsheet models for forecasting, Maloney

**IT'S BASED ON THE TIME-PROVEN UNIX<sup>®</sup> PLATFORM**

**NT?**



says. Simulation adds the ability to see relationships between actions and events. "That kind of explanation—that this went up because that

used to reduce the risk in business restructuring and cost-cutting measures, addressing questions such as "how much cost should you cut, and

that] it was not going to survive in any case unless it did other things or got out of a certain market." Through simulations, such companies can discern the likelihood of success under a variety of options. Similarly, by positing marketing decisions such as product introductions or price changes, companies can gauge customers' and competitors' reactions before they take the plunge.

**"COMPUTER SIMULATIONS TAKE ADVANTAGE OF ALL THE INFORMATION AVAILABLE, AND BY DOING IT IN A STRUCTURED WAY, THEY ENSURE CONSISTENCY AND TRACEABILITY OF THE FORECAST."**

*—Stephen Maloney*

went down because this happened here, and we did this and they did that—is more than just numbers," Maloney says. "It explains why things happen as they do." That's something spreadsheets never do.

Devonrue models have also been

when you're done, will you still be competitive?" Maloney explains. "A company may assume that if it cuts costs enough, everything will turn out fine. [Then,] after it goes through a few years of this kind of gut-wrenching change, [it discovers

**T** EACHING MANAGERS TO become more market-oriented is the mission of Strat-X International, a management-development consultancy in Cambridge, Mass. The company uses simulation to reinforce important lessons from its three- to five-day training sessions, allowing participants to put new attitudes and skills to work before they go back to the real world, according to Julia

AND RUNS THE NUMBER-ONE RISC PLATFORM—SPARC.®

NOT!



Downs, Strat-X programs manager. "Our methods are very action-oriented," she says. "It's important that once you learn the concept, you apply it immediately. With a simulation, you can afford to make mistakes and not waste a real budget with real money and real products."

Teams of five or six members representing competing companies make product-portfolio and other business decisions. A simulation tool called MarkStrat collects these decisions and provides feedback on the teams' relative competitive positions. The purpose, Downs says, is to promote cultural change—"changing how people attack problems, moving them from a tactical, short-term mind-set to a more-strategic, long-term mind-set."

Because it takes place in an imaginary competitive environment, the Strat-X simulation might be dismissed as a game. But games are of-

**S**IMULATION  
ALLOWS PEOPLE  
TO REVIEW AND  
DOCUMENT  
ASSUMPTIONS AND  
WHAT THEY MEAN  
IN TERMS OF  
ACTION.

ten the most effective way to get an important point across, according to Jim Edgerton, a training specialist with the World Bank's Economic Development Institute. (Edgerton stresses that he is speaking for himself and not the World Bank.) A good simulation, he says, "must engage not just the intellect but also the

emotions and excitement of the participants. When they are thus activated, the quality and longevity of learning are greatly enhanced."

Edgerton customized a version of Decisions, Decisions—a simulation game from Tom Snyder Productions, of Watertown, Mass.—to help World Bank officials from industrialized nations "appreciate the decision-making environment of a poor farmer who has very few options and is under enormous pressure from money lenders and the like." But so far he has been unable to find funding for its distribution. "Part of the value of such a simulation is that it removes people temporarily from their normal environment and modes of thinking and behavior, and removes any sense of hierarchy within the group," Edgerton says. "The more successful you are at that, the greater the learning."

Some game vendors have discov-

**IT'S AN OPEN SOFTWARE ENVIRONMENT THAT'S BASED ON INDUSTRY  
IT'S READY TO RIGHTSIZE YOUR ENTIRE ENTERPRISE RIGHT NOW. FOR**

**IT'S SOL**



ered that there is serious money to be made in building simulation games for industry. In Orinda, Calif., Maxis has tailored SimCity, its best-selling game that lets players act as planners and mayors of cities of their own design, to create SimRefinery, a training tool for Chevron Corp., and SimPower, for the Pacific Gas and Electric Co. Companies such as Dow Chemical, Motorola and Coca-Cola are using a business-simulation game called Capitalist Pig to train new managers, according to a representative of the manufacturer, Pluma Software in Mesa, Ariz.

But building simulations is hardly fun and games. SimCity costs \$80, but a customized version can cost as much as \$500,000, according to published reports. Whirlpool's Wood and two assistants spent nearly 18 work months building a model of the Evansville factory for the refrigerator simulation. Simulations now take

**"SIMULATION IS  
A VEHICLE FOR  
IDENTIFYING THE  
VERY DIFFERENT  
WAYS IN WHICH  
THE WORLD CAN  
TURN OUT."**

*—Maloney*

two or three months to build, Wood says. And deciding what facts and assumptions go into the model is crucial to the validity of its output, according to Continuum's Hardy. "There's never a 100 percent guarantee, because the numbers are only as good as the validity of their input," he points out.

Another drawback is that the value of investing in simulation technology is not always apparent to senior management. "In some ways, it's a difficult business sell because it's hard to prove what it's going to do," Hardy says. "It may take an initial leap of faith. Where you have cynics and very tight budget pressures, efforts like this are hurt."

At Continuum, executives are taking a wait-and-see attitude. "Their reaction has been to go along with it for a while," Hardy says, "but after a year of playing with it, they want to see successful projects—where someone besides me says this is a good thing and it paid for itself. I think that's fair. We're in the process of proving it to them." ☐

*Mickey Williamson is a technical journalist based in Warwick, Mass., who specializes in emerging technologies. She heads the Qwerty Group.*

**TANDARDS. IT RUNS WINDOWS APPLICATIONS.\* AND  
DETAILS AND A FREE DEMO DISK, CALL 1-800-SUNSOFT.**

 **SunSoft**

**ARIS!**

**NOW  
ON  
X86**

Microsystems, Inc. All other registered marks and trademarks are the property of their respective companies. \*Third-party software may be required.



# USING NOTES, YOU POUT YOUR HEAD IN NEW YORK AND STILL LEAVE YOUR HEAD



**Project Alert**  
 Author: Ted Brackmann (New York)    Composed: 08/31 04:59 PM  
 Subject: Alert: Client requesting materials change

At today's client review meeting, Mr. Crump announced that he has changed his mind and now wants to install the energy saving glass (ES-0266-X) in all external windows. I advised him that this would force design changes and possibly result in a slip in the schedule and an increase in overall cost. He is totally committed to making the change based on the future energy savings, and is convinced that we can pull it off without delaying the project or exceeding the budget.

Here are some preliminary cost estimates - Let's determine a plan of action ASAP. To move forward we'll need drawing adjustments, ECO's, materials requisitions and the OK from Thierry's team in Neuilly. I've pulled the figures below from the Supplier's Catalog database. Let's hope we can locate the glass and negotiate a better price with the supplier.

| DESCRIPTION    | PART #    | UNIT COST | QUANTITY | TOTAL        |
|----------------|-----------|-----------|----------|--------------|
| Standard Glass | PW-00645  | \$623.00  | 644      | \$401,212.00 |
| Energy Saver   | ES-0266-X | \$692.80  | 644      | \$446,163.20 |
| Cost of Change |           |           |          | \$44,951.20  |

Following a client meeting, Ted, the Account Manager in NY, enters a Project Alert in the Project Tracking Database, describing some last-minute client changes. All key individuals on the project are automatically notified. He attaches a price list from his Supplier Catalog database.

Fichier Edition Due Messagerie Créer Texte Outils Définir Fenêtre  
 Project Tracking Neuilly Centre - Main View

Topic  
 31/08/93  
 Alert: Client requesting materials change (Ted Brackmann (New York), 7 responses)  
 We must not allow this to cause an overrun! (Renee D'Argent (Paris), 1 response)  
 Consider future energy savings (\$\$) into cost - I will work up numbers (Eline Salzman (NYC))  
 This change cannot be allowed to affect the completion date! (James Crump (New York))  
 Only one supplier in Paris carries this new window - I will inquire today on availability (Auguste Harris, 1 response)  
 Auguste - Here are the exact specs for the purchase order - can he meet our delivery schedule? (Ted Brackmann (New York))  
 Mon Dieu! A major change at this late date? (Thierry Bouchard (Neuilly))  
 Revised drawings for approval - ECO will be routed today (Robert Hughes (San Francisco))  
 22/08/93  
 ECO AP  
 Response to "Alert: Client requesting materials change"  
 Author: Thierry Bouchard (Neuilly)    Composed: 31/08 23:58

Replies  
 28/07/93  
 Change  
 Mon Dieu! A major change at this late date?  
 18/07/93  
 MEWS  
 11/07/93  
 LABOR  
 30/06/93  
 ARCHIT  
 29/05/93  
 ECO

You are trying to drive me mad, n'est ce pas? I cannot encourage more changes at this point, since any delay in delivery of materials past 10 Octobre will result in total labor cost of roughly \$3,500 francs each day!! Also, we MUST have all glass in place by 1 Nov. before winter weather slows us down BUT... If you can get the new drawings and ECO to me in the next 24 hours with an acceptable delivery date, then I think I will be able to work it into the current construction schedule and plan labor accordingly. It'll be on the lookout for the ECO and the drawings tomorrow, otherwise I'm afraid we must tell our client that it cannot be done - Thierry

Thierry, the construction site manager in Neuilly is paged via Notes, see the Alert (as well as responses from other team members) from his Powerbook at the site. He responds that changes are possible only if the ECO and proper procedure are completed within 24 hours.



# CAN WORK WITH WORK, AN ARM IN PARIS EART IN SAN FRANCISCO.

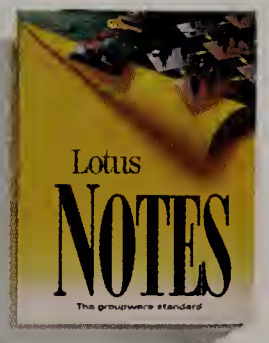


## LOTUS NOTES MAKES TEAMS WORK.

Every day, more companies around the world are realizing the unique business advantages of Lotus Notes.<sup>®</sup> Because Notes lets teams access, track, share and organize information in ways never before possible, they can now respond more quickly and effectively to the everyday business demands of customer service, account management, product development, and more.

Let's see how Notes helped one team quickly resolve a problem caused by a last-minute client request. It involves the construction of a building in Neuilly, France, designed by an architect in the San Francisco office of a company headquartered in New York. Without Notes, this kind of responsive problem solving doesn't happen.

Notes works on all popular computing platforms including Windows,<sup>™</sup> Macintosh,<sup>®</sup> OS/2<sup>®</sup> and UNIX<sup>®</sup>. And with Notes' unique data replication feature, you can work anywhere and automatically get up-to-date information when you need it.



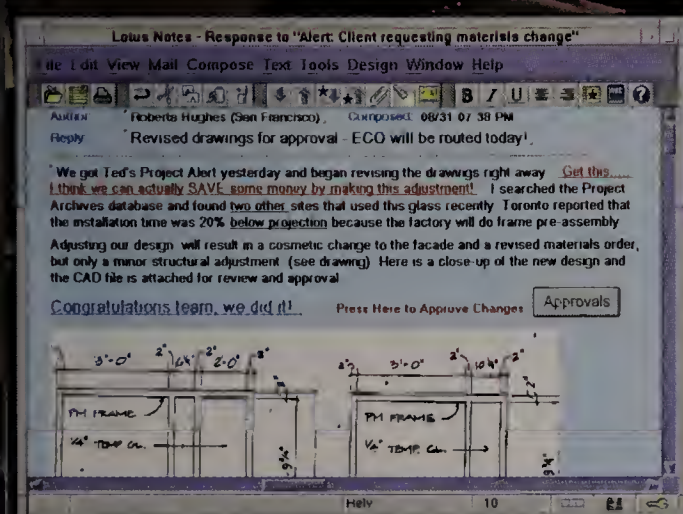
To experience the power of Notes, pick up a Starter Pack<sup>™</sup> for just \$995. It comes with one Lotus Notes Server for Windows and two Notes Clients for Windows. Plus 25 popular ready-to-use applications, and a "Getting Started" video that helps you get up and running quickly.

For a free demo disk, or to become a Lotus Business Partner, call **1-800-828-7086, ext. 9230** or visit your Lotus Authorized Reseller.

**Lotus**  
Working Together<sup>®</sup>

© 1993 Lotus Development Corporation, 55 Cambridge Parkway, Cambridge, MA 02142. Lotus Notes is a registered trademark and Starter Pack is a trademark of Lotus Development Corporation. Windows is a trademark of Microsoft Corporation. Macintosh is a registered trademark and PowerBook is a trademark of Apple Computer Inc. OS/2 is a registered trademark of International Business Machines Corporation. UNIX is a registered trademark of the UNIX Systems Laboratory Inc.

*Roberta, the architect in San Francisco, gets to work on the drawings. But first, she checks the Project Archives database and reads about a similar job in Toronto where money was actually saved even though material costs increased. She sends the revised drawings, including the details on the Toronto job, for the team's approval.*





**MIKE TREMBLAY:**

*"When our corporate strategy shifted to include new lines of business, we had to develop new competencies that would support the changes."*





---

# NO PANE, NO GAIN

---

## STORYLINE

**At window manufacturer Andersen Corp., the distribution processes that served mass production so well couldn't keep pace with the company's move into customization. Management recognized an important fact: All the custom casements, Terratone colors and low-energy glass in the world would not satisfy customers if products were not delivered to the right place at the right time. Rather than scale back on product offerings, it opted to change its business processes. Now, both standard and custom offerings move with equal speed, accuracy and efficiency from Andersen's Minnesota facility into the distribution channels.**

BY MEGAN SANTOSUS

**A FEW YEARS AGO**, the people at Andersen Corp. learned an important lesson: Too much of a good thing can sometimes lead to confusion.

In the early 1980s, the Bayport, Minn., manufacturer of windows and patio doors started to expand its product lines in response to changing consumer demands. Along with the mass-produced, standard items that earned the company its bread and butter for decades, Andersen increased the number of available options and began manufacturing products for the make-to-order and custom markets. However, the distribution processes that served mass production so well proved unable to keep



pace with the growing number of unique items being manufactured.

Inefficiencies in product-labeling, inventory management, order-scheduling and shipment verification reached a critical level in 1991, when 20 percent of all customer deliveries contained at least one shipping or invoicing mistake. While trying to satisfy consumers with a wide variety

grudgingly calls the new business model "mass customization."

The leading role in revamping business processes to support mass customization fell upon the IS group. "Order fulfillment—which includes all the processes that occur between the time an order is received until the finished product is shipped to customers—is the source of all our

tracking and distributing such products. The increasingly diverse product mix created a daunting logistical challenge that required a well-planned and coordinated response.

**A**ndersen is certainly accustomed to accommodating changes in its business. The 90 years since Hans J. Andersen founded the company have been marked by continuous expansion. From its origins as a retail lumberyard, the privately held company has grown into the world's largest manufacturer of wooden-frame windows and doors,



**KIM KORN:** "The methodology we developed has been critical to our success."

of products, Andersen unwittingly ended up compromising service to the distributors and retailers who were entrusted with selling those products.

Instead of scaling back on product offerings, management opted to change its business processes. "Our dominance was built upon our ability to create economies of scale, and we achieved a real competency in this area," explains Manager of Business Systems Mike Tremblay, who heads up the 150-person IS group. "When our corporate strategy shifted to include new lines of business, we had to develop new competencies that would support the changes." For lack of a better term, Tremblay

revenues," says Tremblay. "[These] processes are very information-intensive. Management recognized that technology was the critical enabler to reengineering them."

Just how information-intensive is best illustrated by the number of line items that make up customer orders. In 1992, custom and unique products (custom products are variations of standard items; unique ones are built from the ground up) generated 25 percent of sales yet accounted for 54 percent of the more than two million line items that were recorded, tracked and verified during the course of filling orders. Before 1990, Andersen had no standard processes or systems in place for labeling,

## Window Boxes

.....  
Point-of-sale kiosks at distributor and retail sites help end customers look over what they hope to look through

**G**etting a handle on internal distribution was only one of the challenges that window-maker Andersen Corp. faced as a result of increasing its product lines. Trying to sell the thousands of new and custom products also presented a problem. So in 1989, the company set out to develop a system that could help distributors and retailers configure and price products.

Ten of these customers were invited to sit down with developers to help design the interfaces to a desktop system. "We asked them, 'How would you sell our products if you didn't have any limitations?'" says Mike Tremblay, Andersen's manager of business systems. "We then developed the necessary tools [to] facilitate the selling of our products."

The result of this cooperative effort



thanks to such innovations as interchangeable frame parts, complete window units and gliding doors.

During the 1980s, Andersen tripled its volume of business. With nearly 4,000 employees and \$1 billion in annual sales, the company serves segments of both the residential and commercial markets. Yet Tremblay concedes that the rapid move into the custom marketplace plunged the company into an unfamiliar, reactive mode. "We should have recognized the shift in the market earlier than we did," he admits. "When we started, we were acting defensively." Once the initial saw-

dust settled, however, Andersen turned to reengineering coupled with investments in information technology to fulfill its new business objectives.

In 1990, Andersen initiated a systematic, incremental reengineering and process-improvement effort, primarily focusing on the areas of internal distribution and order fulfillment. The overriding goal of the ongoing effort, says Tremblay, is "to improve service so that our customers like doing business with us better than anyone else."

The IS group developed a standard methodology for reengineering

projects. The guiding principle is that any improvement effort must have a clearly defined business objective. If that condition is met, IS determines whether a process will be completely reengineered or simply improved through techniques such as total quality management or continuous improvement. The methodology calls for improving pro-

**"We've made it just as cost-effective to manufacture and ship one unique item per year as it is to manufacture and ship 2,000 items per year."**

—Kim Korn

cesses, such as internal distribution, rather than functions, such as picking and loading.

"We spent a lot of time coming up with the high-level conceptual objectives and the methodology to achieve them," states Kim Korn, manager of production planning. "More than anything else, the methodology we developed has been critical to our success."

IT projects that are undertaken in support of improvement efforts must make use of flexible tools in order to enable future changes. Andersen tries to implement IT solutions that can serve as a foundation in subsequent reengineering and process-improvement efforts. (The company is currently examining alternatives to its two-step external-distribution process but declines to disclose details at this time.)

To get started, IS used a report-card-style assessment to rate every major process within the standard, custom and make-to-order lines of business. The business case for reengineering internal distribution was readily apparent.

With the help of internal staff and consultants from Ernst & Young, Andersen assembled a multidisciplinary team to implement a prod-



**WINDOW OF KNOWLEDGE:** *What you see is what you get.*

is the Window of Knowledge (WOK), a multimedia point-of-sale system featuring Apple Macintoshes, laser discs, full-motion video and an Oracle database with more than 500,000 product records. Along with WOK, Andersen built a Unix-based dedicated publishing network over which pricing and product information is sent. The publishing network links suppliers, distributors and retailers with Andersen, allowing everyone to share product information.

Using an in-store WOK terminal, a salesperson can sit down with a consumer and create an accurate visual representation of what a custom product will look like. In addition, WOK can determine product specifications and price quotes within seconds, which is a huge improvement over previous methods. "Arch windows used to have 16 pages of order calculations, complete with square roots," Tremblay says. "When we had 10,000 part numbers, it could take an hour and a half to prepare a quote, so many customers ended up limiting options because they couldn't take the time."

As of March 1993, 400 WOK systems were installed at distributor and retailer sites. According to Tremblay, 92 percent of participating retailers report improved accuracy, while 46 percent say that WOK has increased sales an average of 20 percent. Despite such gains, Andersen still has to sell the system to its traditionally computer-shy target audience. To get more signed on, Andersen subsidizes the cost of the hardware, provides the software and data communications, and offers ongoing support and training. "With the Window of Knowledge system," says Tremblay, "we're trying to provide our customers with the tools to extract all the product information they need."

—M. Santosus



## TECHNICAL PROFILE

**Andersen Corp.** is a 90-year-old private manufacturer of wood-framed windows and patio doors with headquarters in Bayport, Minn. In 1992, Andersen had sales of \$1 billion and nearly 4,000 employees. The company maintains a 62-acre manufacturing facility where every product is prepackaged and prelabeled prior to distribution. Andersen's two-step distribution process includes more than 100 distributors and thousands of retailers nationwide as well as distributors in Europe and on the Pacific Rim.

In the early 1980s, Andersen began expanding its product offerings and manufacturing custom products. As a result, the company's technical infrastructure has been undergoing changes and additions. The customer-order file for standardized products runs on a Unisys mainframe, but as more custom products are manufactured, the file is being modified and gradually moved onto Sequent minicomputers. The minis are integrated with a fault-tolerant Stratus computer that serves as a communications processor for distribution applications. The Window of Knowledge database also runs on a Sequent.

**Hardware:** Sequent 2000/450s and fault-tolerant Stratus R310 for distribution and loading; various IBM-compatible 286s, 386s and 486s; Apple Macintoshes; Telxon PTC-960 and PTC-860IM radio-frequency microcomputers.

**Software:** Major applications include distribution developed in-house in Cobol, GUI interfaces on handhelds developed in-house in C, and Microsoft Excel; currently developing an order/entry system using object-oriented technology.

**Communications:** An FDDI network with 34 intelligent hubs linking PCs and minicomputers; a radio-frequency network linking handheld and forklift-mounted terminals in the distribution area.

uct-identification system that includes bar codes. Manually created labels for mass-produced items have been replaced with bar codes created from standard product descriptions. Unique items are also bar-coded, but the labels contain randomly assigned numbers that link each product to its line item on a customer order.



**SHIP SHAPE:** Andersen's IS group reengineered its distribution and order-fulfillment processes to improve shipping accuracy and efficiency. Workers now use bar-code scanning and other technologies to move products from manufacturing through distribution.



With identification improved, the team developed a PC-based tool that provides online shipment verification of customer orders. Loaders were involved in prototyping and designing the system, and proved helpful in discovering bugs. They even sold management on the idea. "The loaders demonstrated and explained the system to the board of directors," says Tremblay. This helped reinforce both their involvement in process improvement and their sense of ownership of the system.

More products meant less space

for each item; this required Andersen to improve both warehouse efficiency and inventory accuracy. At the same time the verification system was being developed, inventory was consolidated from 22 sites into five. With 60,000 transactions occurring among receivers, pickers and loaders each day, Andersen wanted to get as close as possible to collecting data in real time. This would vastly improve the process of reporting shortages and minimize the need to disrupt manufacturing.

"With the manual auditing processes, hours used to go by between





# No Fences. No Boundaries. No Limits. That's The Freedom Of CA90s.

The freedom to choose the best applications without worrying about hardware constraints.

The freedom to right-size your entire computing environment with the best mix of hardware platforms.

And the freedom to integrate and automate all your applications across the many proprietary, closed environments you face today. It's all there inside the most comprehensive architecture ever developed: CA90s.

The only architecture that supports every major hardware platform including IBM, Digital, Hewlett-Packard,



Apple, Fujitsu, Bull, Data General, Tandem and Hitachi. All the major operating systems: MVS, VSE, VM, VMS, UNIX, APPLE, WINDOWS, DOS and OS/2.

And the world's broadest range of integrated software solutions, covering systems management, information management and business applications.

If you're tired of being fenced in, call 1-800-CALL CAI for complete information on CA90s.

The architecture that can set you free.

**COMPUTER  
ASSOCIATES**  
*Software superior by design.*



the time a picker discovered a product was missing and the time manufacturing was notified," says Korn. "With real-time collection, manufacturing can know when the picker knows, which means the line doesn't have to be disrupted so that a missing product can be manufactured in time for loading."

The technical infrastructure that links receiving and picking includes portable radio-frequency devices that run on a radio-frequency network tied to a fault-tolerant mini-

computer that serves as a communications processor. A fiber distributed data interface (FDDI) network with 34 intelligent hubs circles the facility and links everything together.

computer that serves as a communications processor. A fiber distributed data interface (FDDI) network with 34 intelligent hubs circles the facility and links everything together.

Once the infrastructure was built, the shipment-verification system was moved off the PCs onto the fault-tolerant platform and integrated with the radio-frequency technology. As a result, receiving, picking and loading are much more tightly coordinated than before. Thus far, customer service has improved significantly: Even as the number of unique items manufactured has in-

creased tenfold, the shipping mistakes that once plagued the company have practically been eliminated. In 1992, Andersen shipped 6.5 million cartons containing 23.7 million parts and 108,000 unique items while maintaining a shipping-discrepancy rate of less than 1 percent.

Currently, a team of developers is writing a software program that is designed to eliminate discrepancies entirely. Instead of pickers working a shift or two ahead of loaders, the software will allow the loaders to

Andersen has achieved new levels of inventory efficiency. "One hundred percent of all finished goods are tracked on a real-time, perpetual basis," asserts Korn. This is an improvement over a couple of years ago, when Andersen had no way to keep tabs on the custom and make-to-order items that accounted for nearly 30 percent of sales.

"We've made it just as cost-effective to manufacture and ship one unique item per year as it is to man-

**"Most people in our industry view an order in terms of a full shipping container. We want to redefine an order in terms of an individual consumer project."**

—Mike Tremblay

ufacture and ship 2,000 items per year," says Korn. "We've succeeded in eliminating many of the economies of scale that we relied on."

The reengineering team is also using object-oriented technology to develop an order-capture system that Andersen hopes will redefine the concept of an order. "Most people in our industry view an order in terms of a full shipping container," Tremblay explains. "We want to redefine an order in terms of an individual consumer project[—rather than a distributor's shipment]. By the time we receive an order from our distributors, we are blinded to individual expectations."

Although reengineering work remains, Tremblay believes Andersen is well on its way to achieving a new competency in mass customization. "The merging of standard and custom products into feature windows that can be configured in the marketplace, much in the manner of Legos, is where the rubber hits the road," he says. "We're on a path of becoming good in both mass production and high-quality customization." 



DAN THRON, VALERIE GREEN and BOB SAXLER (l.-r.) were part of the team charged with supporting mass customization.

control the process. Eliminating the stacks of products lined up in front of the shipping docks will enable a continuous flow of materials that should further improve accuracy and help Andersen achieve its goal of shipping twice as many products from its existing facility. "We can avoid building an additional facility and save at least \$12 million on construction and \$6 million in annual operating costs," explains Korn. Eliminating discrepancies entirely could also save customers the time and expense of verifying Andersen's shipments.



Beneficial

# THE CIO'S PERSPECTIVE ON MULTIMEDIA

Martin Marietta

*Two information  
executives talk about  
successful training with  
IBM multimedia*



**W**hat do Beneficial Corporation and Martin Marietta Corporation have in common? They are both multi-billion dollar organizations that have thousands of employees to train. Both Beneficial Data Processing Corporation and Martin Marietta are utilizing IBM multimedia to provide that training on IBM Personal System/2® Model 70 computers equipped with M-Motion™ Video Adapter/A software. And both work with IBM Business Partner, Midi, Inc., to design and develop their multimedia courseware.



**Multimedia throughout North America**  
With 1,000 branches throughout the United States and Canada and more than 5,000 branch employees, finding a consistent training method was always of paramount importance for subsidiaries of Wilmington, Delaware-based Beneficial Corporation, a financial services holding company. But when the company's subsidiaries announced a major overhaul of their branch office data processing operations to a new IBM Application System/400®-based system, executives faced a considerable challenge.

Called BENCOM III, the new system changed everything in the administration and management of branch operations — from marketing to cash drawer procedures, product pricing data and managing personal loan and mortgage status.

Prior to the system's implementation, each Beneficial customer had an individual

ledger card for transaction record-keeping and history — a system that

sometimes kept the customer waiting for service and always kept branch employees tied up with clerical work. The new

system would organize and streamline every operation online for the

company's consumer finance, banking and insurance operations.

BENCOM III had the potential of greatly increasing office productivity and customer service standards, but those benefits would be realized only if district and branch managers and staffs put the power of the system to work for them. The right training was critical. Beneficial made the transition to IBM computer-based training (CBT) in 1990, and incorporated IBM multimedia in 1991.

#### **Space age multimedia training**

When Bethesda, Maryland-based Martin Marietta, a leading provider of aerospace, electronics and information technologies, merged with GE Aerospace in April 1993, an IBM interactive multimedia training system had been used by GE Aerospace for three years. GE Aerospace provided the U.S. government with a wide array of products and services for space and military needs. These activities continue as part of the combined operations resulting from the merger.

Because the financial consequences of noncompliance with government rules and

regulations can be significant and because procedures can be long and intricate, GE Aerospace was always investigating new and more effective methods of training employees. In 1990, they introduced an IBM multimedia solution called Compliance Education & Training. By the time GE Aerospace merged with Martin Marietta, more than 30,000 employees had completed over 200,000 individual training sessions using this approach. Martin Marietta is in the process of evaluating how interactive multimedia may be expanded into other areas of the company.

## Talking to the Top

*We interviewed information executives, Dennis J. Wharton of Beneficial Data Processing Corporation and Joseph R. Cleveland of Martin Marietta, and asked them to share their views on multimedia training. Both were instrumental in bringing multimedia training into their businesses and are powerful believers in the technology.*

### **Q Why did you make the switch to multimedia training?**

#### **BENEFICIAL**

We had been using ledger cards for 75 years. When we decided to get rid of them and automate our procedures, we were making a drastic change in the way our branches operated. In the past, only one person in each branch was using a data entry terminal to communicate with the company's IBM Enterprise System/9000™ mainframe computers in Peapack, New Jersey. With the new system, every branch employee, including managers, was going to have a video display terminal on his or her desk. While we knew that some of our newer employees had used computers before, many of our older employees had not, and they weren't comfortable with the idea. An entirely different kind of training



#### **BENEFICIAL**

#### **Dennis J. Wharton, Beneficial Data Processing Corporation**

As senior vice president of Beneficial Data Processing Corporation, Mr. Wharton is responsible for systems design, implementation and support for Beneficial Management Corporation of America's branch office operations.

Mr. Wharton has spent 32 years with Beneficial and has extensive background in branch operations and data processing. From 1961 through 1977, he worked in branch operations in New York, Louisiana and Texas as a branch manager, field auditor, district manager and assistant vice president. Since 1978, he has worked in Beneficial Management's corporate headquarters, specifically with the Beneficial Data Processing Corporation.

His 17 years of experience in branch operations and 15 years in data processing give him a unique perspective which allows him to incorporate the best of both worlds into systems design, and in particular, data processing solutions for Beneficial's international branch office network. 



was called for — it had to be consistent, easily understood, cost-effective and allow for refresher courses. We decided that the only way to meet our needs was with an IBM computer-based training system utilizing extensive graphics, interaction and IBM multimedia.

## MARTIN MARIETTA

When we first implemented multimedia training, its original focus was compliance. Compliance is an area that is very specific in terms of the behaviors required in governmental business, and we consider it one of our prime responsibilities in striving for total customer satisfaction. It's tough to get people excited about reading and retaining reams of material on complex laws, regulations and contractual clauses. We were looking for a more creative and cost-effective way to get people energized about learning the information they needed to know to discharge their responsibilities effectively and in a compliant manner. We needed to hold their attention and give them the opportunity to learn at their own pace in an anonymous setting. When we went through a requirements analysis on how we might achieve that, interactive multimedia came to light for us.



## MARTIN MARIETTA

In the past, there were instructor-led sessions and seminars and a large body of documents on the subject matter. There were also a number of counselors that employees could go to if they had questions about any specific part of the subject matter. Each counselor might answer the same question a little differently based on their own experience and knowledge, and changes and revisions to the documentation were costly and difficult to make. Retention and mastery were not at a level that we felt was cost-effective.



## MARTIN MARIETTA

### Joseph R. Cleveland, Martin Marietta Corporation

As the head of internal information systems for Martin Marietta Corporation, Mr. Cleveland is responsible for all internal information systems technologies used throughout the company.

Prior to joining Martin Marietta, Mr. Cleveland was manager of Aerospace Information Technology, an organization that handled information technology and services throughout GE Aerospace.

Previously, he served as manager of system integration and architecture for GE Aerospace's consolidated Information Technology Operation, and manager of information technology for Defense Systems.

Mr. Cleveland joined General Electric Company as a member of the Engineering Department of GE Medical Systems in 1970. From 1974 to 1982, he held positions of increasing responsibility including manager of systems engineering and manager of operations and design support. From 1982 to 1986, he was managing director of GE Medical Systems Radlett Operations in England, with responsibilities for all engineering, manufacturing, quality assurance, personnel and finance operations. 

## Q How was training delivered in the past and what were its limitations?

### BENEFICIAL

New employees generally depended on someone in the branch — normally the manager — to assist them with training. They also relied upon textbooks, audiocassettes, and their own experience. This was time-consuming and unstimulating. You can't afford to do that anymore. While they're learning, you're losing business. We're reviewing all existing branch training programs and when appropriate, adding CBT and multimedia to enhance the learning experience.

## Q How did you introduce multimedia training to your employees and did they have any apprehensions about using it?

### BENEFICIAL

We encouraged branch employees to experiment with CBT before bringing them into one of our centralized training centers. We told them, "Just play with it and if you get stuck, turn it off." Familiarizing themselves with the



system in a nonthreatening environment allayed some of their fears — and with keyboard controls and a non-technical language menu-driven system, they didn't even have to know how to type.

Once we brought the branch employees into the training centers, we had to recognize that they had varying degrees of experience. Some had been with us for one year, others for five years and others for 25 years. We only had two or three days to train them and we wanted them to concentrate on the main aspects of the BENCOM III system — not feel intimidated by peers who may be grasping the information faster than they. Being able to review lessons at their own branch offices relieved a lot of this pressure. They could train themselves at their own speed, and as many times as they liked.

#### MARTIN MARIETTA

First, we had to remove any concerns that this was a Big-Brother-looking-over-your-shoulder kind of approach. People were initially excited about the possibility of being able to interact with the computer, especially after they saw some of the prototypical versions of this training approach. But we had to convince them that this would be a system where they could pace themselves and that the rate of their progress was confidential. They could go back to a training module as many times as they wanted, and if they answered something incorrectly, nobody would know but them. The anonymity of the training made people feel more comfortable.

#### Q Why did you move beyond computer-based training?

##### BENEFICIAL

Even with the graphics and interactivity that CBT offers, it can only hold a person's attention for so long. After the novelty wears off, it becomes passe. Multimedia adds the excitement of full-motion video, audio and even more extensive graphics — which enhances the learning process even more.

To add multimedia training, we went through our existing CBT lessons and picked out five or six different modules that lent themselves to multimedia presentation.

Then we redid them, consolidated them, and added scripts and video.

We actually filmed a variety of operating situations, such as interactions within a branch, and converted them into multimedia audiovisual presentations. People learn better when they can see and hear and get interactive feedback.

“

*Employees can also take the training on the PS/2 computer in their branch office. Training is distributed over telephone lines to our network of AS/400 minicomputers in the branches.*

”

*— Dennis J. Wharton,  
Beneficial Data  
Processing Corporation*

#### MARTIN MARIETTA

We evaluated different forms of training, and interactive multimedia yielded a much higher mastery and retention rate than CBT. It gets the person more involved.

#### Q Where and how is training delivered?

##### BENEFICIAL

We have eight training centers throughout the United States and one in Canada, each equipped with CBT and multimedia capability.

Employees can also take training on the PS/2® computer in their branch office. Training is distributed over telephone lines to our network of IBM AS/400® minicomputers in the branches. The AS/400s house the CBT modules which are uploaded to the PS/2s.

We currently have more than 200 individual CBT lessons developed, each between 15 and 30 minutes in duration. Our plan is to equip each one of our branches for multimedia as well. Our multimedia lessons were initially on laserdiscs. We are now in the process of converting them to compact discs, and all future development will be on CDs. That will make it easier for us to distribute multimedia training to the branches when they are equipped to receive it.

#### MARTIN MARIETTA

We have about 15 locations which are equipped with training rooms. Each training room contains a number of private workstations where employees can go through training modules in an unattended setting. Each workstation cubicle is equipped with a PS/2 and M-Motion Video Adapter A software, an IBM 8515 monitor with an Elographics touch-screen capability, a Pioneer videodisc player, an IBM CD-ROM drive, an amplifier and headset, and courseware in more than 20 different modules. The employees schedule themselves into a training center, put the headphones on, insert the



appropriate disk and just follow the instructions on the screen. At some point, we envision the same kind of training being delivered over a network to the desktop.

## Q How have employees reacted to multimedia training?

### BENEFICIAL

They're very supportive of it and have given it excellent reviews. All employees are asked to complete an anonymous survey after a training class. Eighty-seven percent have either been very or extremely satisfied with it — and they've given us ideas for additional multimedia applications. They like it and want more of it.

### MARTIN MARIETTA

They've been quite positive. We routinely ask users to evaluate the training. We typically ask five specific questions in which we ask them to rate the extent to which the course objective was achieved, how the subject matter was organized, the strength of multimedia as a training tool, the relevance of the course materials for their job, and the total usefulness of the course. We ask them to grade the program from excellent to good, average or poor. Ninety percent have rated it in the good to excellent range, so we feel that it's been quite successful.

## Q Have you expanded your multimedia application beyond its original use?

### BENEFICIAL

Most definitely. It's not just for computer system training in the branches anymore. New applications are being developed for product knowledge training, human resources training, marketing training, new employee lessons, refresher courses, customer service issues, and we're even looking at some sensitivity training. We can deliver this instruction very powerfully through multimedia.

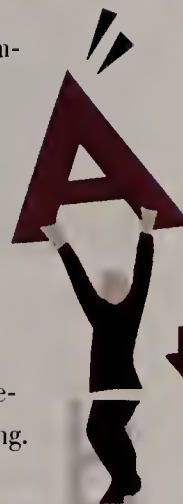
“  
If you look at  
the lower costs of  
documentation, reduced  
training time and the  
higher retention  
and mastery rates, you  
have to conclude  
that you are getting a  
good return on your  
investment, especially  
on something as  
vital as compliance in  
our business.

— Joseph R. Cleveland,  
Martin Marietta  
Corporation

We also use multimedia for conference and seminar presentations, and have gotten excellent feedback from attendees.

### MARTIN MARIETTA

In addition to new modules on compliance, there are several others that fall under the broad headings of cultural diversity, sexual harassment, environmental health and safety, and cash management. We are also developing new modules on concurrent engineering, configuration management and pre-retirement counseling.



## Q Do you anticipate new applications in the future?

### BENEFICIAL

We'll be adding new applications in the future, and in many different ways. For example, there may be new legislation that affects our entire operation. If so, we can tape the president of Beneficial explaining how the new legislation will affect the company, combine it with an interactive CBT lesson, transmit the new module overnight on our data lines, and send the video portion to the branches on a CD. It would be like having a video conference call with 1,000 branches. We've never been able to do anything like that before. It's a very powerful medium.

### MARTIN MARIETTA

It's very early in the game to see how the merger will affect future applications. We're trying to look at the best of the best approaches for training within all areas of the company, and certainly interactive multimedia is very high on the list as a proven training method. Some potential applications include customer and product development training.

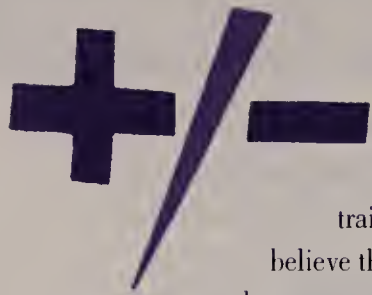
## Q What benefits have multimedia training yielded?

### BENEFICIAL

We have benefited in numerous ways. For one thing, our employees are enjoying the training, which is motivating them to learn more.

They are receiving their training in a uniform, timely and easily understandable manner. Consequently, they have greater product knowledge and communication skills, which translates into a higher level of customer satisfaction. What's more, morale in the branches is much higher. We have been able to retain more employees and new employees are productive much sooner. Customer surveys have indicated marked improvement in service and responsiveness, and we attribute that improvement in no small





measure to our CBT and multimedia training methods. We believe that such training has made us more competitive. Overall, as an organization, we're having our best year ever. We recognize that we have to keep on expanding our training programs if we're going to continue to succeed.

## MARTIN MARIETTA

There's data in the industry that compares the mastery and retention rates of various methods of training, and it concludes that interactive multimedia is by far one of the best. Subject mastery is four times that of traditional approaches while material retention levels are three times as high. If you look at the lower costs of documentation, reduced training time and the higher retention and mastery rates, you have to conclude that you are getting a good return on your investment, especially on something as vital as compliance in our business.

**Q How would you advise other information executives who are considering making the move to multimedia?**

## BENEFICIAL

Have a specific objective in mind — don't just get on the multimedia bandwagon. You have to know what your application of multimedia is going to be and what you expect to get out of it. You can't just say you're going to get improved training. You will, but unless you have a vision of what type of training you want to do, it's just going to be hit or miss. You have to have a well-thought-out plan and a vision for how you want to change the way training is delivered. You also have to get all your hardware and network issues identified and determine the type of connectivity and operating systems you're going to use. This discipline is changing quickly. You don't want to get locked into something that you can't support in the future.

Recognize that there are talented people in your organization that have much to contribute to the development of a multimedia program.

Identify those people and let them drive the creative side of the project. The company will get paid back many times over for it.

## MARTIN MARIETTA

There are four areas that one needs to think through: one, there needs to be a commitment at a high level to support multimedia training because without it, people may argue about whether it's the best method or if it's worth the investment. You have to take those barriers out of the way and say that this subject matter and this initiative are important; two, you have to look at your investment as a leverage over the long term vs. the short term; three, you need to have a very close association with the organization in which you want to implement the training and involve them in the design of the training so you both get some buy-in upfront and establish a partnership for this initiative; and four, the multimedia training needs to be aligned very closely with the information systems architecture strategy for the company because the technology will change and evolve over time and you need to be flexible so that your investment can be leveraged over the long term. 

*This article does not constitute a product endorsement.*

## BENEFICIAL

**For additional information on Beneficial Corporation, contact Robert Amberger, IBM Corp., 300 Executive Drive, West Orange, NJ 07052, 201-325-5789; or, Robert Wade, Public Affairs, Beneficial Management Corp., 100 Beneficial Center, Peapack, NJ 07977, 908-781-3258; or, Jack Noon, Midi, Inc., 100 Thanet Circle, Princeton, NJ 08540, 609-924-4817.**

## MARTIN MARIETTA

**For additional information on Martin Marietta Corporation, contact Girish Jain, IBM Corp., 9200 Corporate Blvd., Rockville, MD 20850, 301-921-7581; or, John A. Townsend, Martin Marietta Corporation, 200 North Warner Road, King of Prussia, PA 19406, 215-354-3484; or, Jack Noon, Midi, Inc., 100 Thanet Circle, Princeton, NJ 08540, 609-924-4817.**

IBM Multimedia is pleased to present this special multimedia editorial section. This bimonthly forum explores how IBM multimedia technology is reenergizing business with an exciting new vision of interactive communications.

## Want to have your stories published?

To forward leads for IBM multimedia stories or to suggest other article topics for this section, fax a note to (404) 238-4298, attention "Editor, *IBM Multimedia Solutions*." Or, write the Editor at IBM Corp., 4111 Northside Parkway, Internal Zip H4P21, Atlanta, GA 30327.

## Get a free subscription — and more information!

For a free subscription to *IBM Multimedia Solutions* magazine — or to get more information on IBM multimedia products and services — call the IBM Multimedia Information Center.

## IBM Multimedia Information Center

**1 800 426-9402, Ext. 170**

(U.S. and Canada only)

Outside U.S. and Canada, (404) 238-1282

The center is open weekdays, 9 a.m. - 6 p.m. E.T.

©IBM, Ultimedia, Personal System/2 PS/2, Application System/400 and AS/400 are registered trademarks of International Business Machines Corp.

™M-Motion and Enterprise System/9000 are trademarks of International Business Machines Corp.

Prices and products in this section are subject to change without notice. References in this publication to IBM products and services do not imply that IBM intends to make them available outside the United States.

**ULTIMEDIA®**  
Multimedia Solutions from IBM





# So powerful, you can even move mountains.



IBM, PS/2 and OS/2 are registered trademarks and Ultimedia, HelpWare and SLC are trademarks of International Business Machines Corporation. Windows is a trademark of Microsoft Corporation. © 1993 IBM Corp.

Introducing the ultimate in peak performance. Four new IBM Ultimedia™ systems that are part of the broadest and most powerful line of multimedia computers available. Full-fledged

| Feature<br>Model          | Processor/<br>Speed  | Hard<br>Drive | Memory                       |
|---------------------------|----------------------|---------------|------------------------------|
| <b>M57<br/>486SLC2™</b>   | 486SLC2<br>50/25 MHz | 212MB         | 8MB<br>expandable<br>to 16MB |
| <b>DV M57<br/>486SLC2</b> | 486SLC2<br>50/25 MHz | 212MB         | 8MB<br>expandable<br>to 16MB |
| <b>M77<br/>486</b>        | 486 SX<br>33 MHz     | 212MB         | 8MB<br>expandable<br>to 32MB |
| <b>M77<br/>486DX2</b>     | 486DX2<br>66/33 MHz  | 212MB         | 8MB<br>expandable<br>to 32MB |

PS/2®s that can also run hundreds of multimedia-enabled applications out there. And thousands more to come.

All four new systems are upgradable and expandable, support CD-ROM XA titles and come with a CD library of applications and demos. OS/2® 2.01, MPM/2, DOS 5.0 and Windows™ 3.1 are pre-installed. And they're all backed by HelpWare™—a range of service and support that's king of the hill, with a 3-year on-site warranty and more.

To find out how IBM Ultimedia can help you do some moving and shaking, call 1 800 IBM-2YOU.



*That's no mouse. It's a microphone,  
and it comes with all our new systems.*

**IBM® ULTIMEDIA™**





# Multimedia, a la node.

*(Serves your entire network.)*

Here's some food for thought. Multimedia networking that lets people easily share data via audio and video communication—anywhere, anytime. That's what distributed multimedia networking from IBM brings to the table. And only IBM can integrate your PS/ValuePoints™, PS/2s®, RISC System/6000® workstations, AS/400® and ES/9000™ systems, and all the key ingredients to satisfy your business's appetite.

It's all a part of the IBM Ultimedia® family. To find out more about our extensive menu including consulting services, call 1 800 426-9402, ext. 340. And get a taste of what we can do for your business.

IBM, PS/2, RISC System/6000, AS/400 and Ultimedia are registered trademarks and PS/ValuePoint and ES/9000 are trademarks of International Business Machines Corporation, © 1993 IBM Corp.







Apple Computer, Inc.

ARDIS

BOOZ ALLEN & HAMILTON

**COMPUTER  
ASSOCIATES**  
Software superior by design

**EDS**

TAKE ADVANTAGE OF CHANGE™

**hp** HEWLETT  
PACKARD

**IMRS**

**Information  
Builders**

Racal-Datacom™

 **Sun**

SYNCORDIA

 **TEXAS  
INSTRUMENTS**

  
**XCELLENET®**

**CIO**

The CIO Perspectives Series <sup>sm</sup>

# Re-Visioning IT:

## Achieving an Enterprise Perspective



**March 13-16, 1994**

Hyatt Grand Cypress  
Orlando, Florida

For more information, or to  
enroll call **800-366-0246**



# WAN WAY OR ANOTHER

Faced with numerous options, companies are pursuing the wide area networking strategy most likely to give them the bandwidth they need, when they need it

BY CHARLES  
PELTON

---

**B**

UILDING THE RIGHT wide area network (WAN) is essentially a balancing act. Two conflicting forces—the volume of information and the frequency and intensity of data transmission—conspire to complicate a company's WAN strategy. "It's the interplay of those two principles that guides internetworking," says Tom Nolle, president of CIMI Corp., a Voorhees, N.J.-based networking consultancy.

If a company moves a lot of information, it needs a data pipe with high bandwidth. That provides economies of scale. But frequently a company doesn't need all its bandwidth all the time. That means it needs to optimize the *utilization* of the data pipe between locations. So if IS can figure out a way to even out the data flow, it will get the most-efficient WAN for the lowest-possible cost.

In the 1980s, many corporations relied on set-bandwidth leased lines—T1, fractional T1 and T3 lines—to move vast amounts of data between mainframes or minicomputers and terminals or PCs. But the growth of distributed architectures and client/server systems gave rise to "bursty" data communications between PCs and LANs located in different offices. The irregular flow of data led many companies to consider a set of network architectures that combines the economies of scale found in leased lines with the vagaries of irregular





**JOE MARCHESE** is pushing GE businesses into sharing backbones, circuits, hardware, software and people. "Our objective is to integrate all those networks into a single, integrated, multiprotocol network."



LAN-to-LAN communication. Many CIOs are considering technologies that are designed to maximize communication-line capacity utilization. These include switched multimegabit data services (SMDS), frame-relay technologies or broadband integrated services digital network (BISDN), now referred to as asynchronous transfer mode (ATM).

Deciding which to choose depends in large part on the size of the company and the number of corporate data destinations. "As size increases, the technical parameters begin to cloud because you have more alternatives and a larger embedded base of applications," says Bill Gewirtz, technical marketing director at AT&T's data communications services in Bridgewater, N.J. Many companies turn to frame relay just for data transport. The technology can be used over a wide range of transmission rates—from 64 Kbps to at least 45 Mbps, otherwise known as T3. (At present, the upper limit of the services offered is 1.5 Mbps, but the standards will support the higher level.) Furthermore, frame relay is readily available from such interexchange carriers as AT&T, MCI, Sprint and Wiltel or from local-exchange carriers. Frame relay provides virtual circuit connections. Applications act as if there's a physical connection between two points. But there's one big problem with frame relay: It can transport data only.

SMDS is also a data-only strategy. Unlike frame relay, SMDS doesn't appear to the user as a point-to-point connection. Instead, the user appears to be attached to a backbone LAN. SMDS is structured for local exchanges, so many large companies use SMDS if they have a large community of users in a relatively compact metropolitan area.

Of the three strategies, ATM intermingles data, voice and video on all trunks. There's no fixed capacity allocated anywhere. That's why so many CIOs are excited about ATM's

**L**arge firms also must decide how much of their WAN environment should run on private networks and how much should be outsourced and operated by public carriers.

potential for client/server WAN environments. But the biggest problem with ATM is cost. A high data rate

(T3 or better) is required for broadband access. And T3 lines are just too expensive for most CIOs.

Wide area networking involves more than the method of data transmission. CIOs and their network managers must consider the type of physical connection between LANs and the internet. If a company is lucky enough to build a set of LANs from scratch—and have them all use essentially the same applications—it can simply look to bridging vendors to provide a link to the network.

Although most people have no more than two protocols running on their desks, many organizations have multiple protocols running their LANs. If that's the case, a company might look at a standards-based pro-



**WILLIAM OSINGA:** *The move to several LANs and a frame-relay WAN strategy "is going to give AmeriGas a better way to more-efficiently cost our fuel products."*



protocol, such as TCP/IP, to get from one LAN to another on its internet. And that means it will need to purchase routers, hubs, frame-relay switches or—for more-legacy-oriented applications—multiplexers.

Larry Levitt, manager of computer services at San Francisco-based Pacific Gas Transmission Co., a natural-gas transporter, was lucky. He didn't need to use TCP/IP when he linked IBM Corp.'s Systems Network Architecture (SNA) and Novell Inc.'s IPX/SPX protocols when he connected 12 sites throughout western Canada and the United States. He used IPX as a bridging protocol because "there wasn't enough diversity in [network operating systems] and the amount of traffic."



Large firms also must decide how much of their WAN environment should run on private networks and how much should be outsourced and operated by public carriers. Companies can use frame-relay or SMDS

**GE** has decided to centralize its WAN strategy and purchasing muscle at the same time that it encourages decentralized decision-making and migrates to an increasingly distributed-computing environment.

technologies on private networks, but they would have to have huge concentrations of traffic and already own the transmission lines to make that choice cost-effective. "If you choose to build a private network, you need a certain size to make the investment worth it," says CIMI's Nolle. Some organizations, such as Pacific Gas Transmission, go private to ensure reliability.

Nonetheless, private networks are something of a dying breed. "It's easier to manage the network when you outsource it," says Marvin Chartoff, principal of the Network Strategies Practice for Ernst & Young in Vienna, Va. "There's less need for staff and tools. If it's all private, you're going to have to monitor the links yourself. You'll have to do your own rerouting."

Generally, when the network is the business, it's not wise to outsource WAN control. Companies selling information services—Lexis, Sabre and GE Information Services (GEIS) come to mind—will need to build their own WANs. But if all that's needed is nightly batch-trans-

mission capabilities, there's every reason to consider outsourcing. The question should be, "Do I derive strategic advantage on the network per se?"

The reality is that most CIOs run organizations that fall between these two extremes. If an organization is large, the IS executive might be tempted to build a private network. If its data is more bursty, IS should look at using a common, outsourced WAN pool. And the larger and more global the company, the greater the possibility that it will employ a diverse set of WAN strategies.

Ultimately, a company's WAN strategy depends on its computing strategy. The more centralized and proprietary the environment, the greater the probability the company will look to traditional routing strategies and, possibly, private networks. The more distributed and client/server-oriented, the greater the allure of frame-relay and ATM strategies. "It's so hard to differentiate networking from computing," says Bill Darden, an MCI global-internetworking architect in Los Angeles.

---

**GE**

*One strategy, multiple approaches*

**T**RY THIS CHALLENGE on for size. Take a \$60.2 billion Fortune 500 company with 12 separate business lines and 284,000 employees spread around the world. Throw in tens of thousands of terminals and PCs lashed together with everything from SNA and DECnet to AppleTalk and NetWare. Add to the mix a corporatewide initiative to move from a "mainframe-centric" computing environment to a distributed, client/server-technology strategy.

That scenario describes the IS and communications challenge at GE. And that's why Joe Marchese, manager of the global data network at GEIS, is charged with forging a single, common WAN strategy. GE's goal is simple. The broadcasting,



# Imagine they're applications.



*Enrico Caruso*



*Etta James*



# With the new IEF<sup>TM</sup> for Client/Server they wouldn't have to just sing solo.



*As revolutionary for  
information systems  
as notes were for music.*

The new IEF for Client/Server is as revolutionary for information systems as notes were for music. Just as sheet music provided Caruso with the same notes that are sung by Etta James, this new integrated development tool provides the structure necessary for different client/server applications to work in harmony.

Whether your needs are for small, rapidly-built departmental systems or enterprise-wide solutions, your applications are integrated within the overall application architecture thanks to the IEF for Client/Server.

The IEF for Client/Server can develop applications very quickly – within weeks – and with unsurpassed functionality. And thanks to its flexibility and reusable design, each new client/server system can be developed faster than the previous one. So you can improve productivity at a faster tempo.

The IEF for Client/Server eliminates the need for training on different languages and 4GLs, databases and communication protocols. Because you design, construct and maintain at a business model level.

The IEF for Client/Server allows in a single specification the flexibility to generate complete applications for a variety of

execution and database platforms. Which means you can go horizontally, vertically or cross-enterprise on systems such as Microsoft,<sup>®</sup> HP,<sup>TM</sup> IBM,<sup>®</sup> Sun,<sup>TM</sup> Sequent,<sup>TM</sup> Tandem,<sup>®</sup> Digital,<sup>TM</sup> NCR,<sup>TM</sup> Siemens-Nixdorf, Oracle,<sup>®</sup> Informix<sup>®</sup> and Sybase.<sup>TM</sup> All without missing a beat.

IEF-generated applications can be changed quickly and easily because modifications are made to business models, not code. So as technology changes, you can take advantage of the most efficient platforms, operating systems and protocols without having to worry that your system will be obsolete.

This enables your company to realize continuous process improvement in a distributed computing environment. One where user needs can be met through individual support systems, departmental systems and enterprise-wide systems. And where many different users can work in concert.

Thus improving productivity, flexibility and your company's competitive position. In short, extending your reach.

For more detailed information, call 1-800-336-5236, extension 1427 today.

And discover why so many companies are singing our praises.

*Crosses  
platforms.*

*Room  
to grow.*

*The results  
you need,  
when you  
need them.*

*A quick  
learner.*

EXTENDING YOUR REACH  
WITH INTEGRATION<sup>®</sup>



IEF and "Extending Your Reach With Integration" are trademarks of Texas Instruments. Microsoft is a registered trademark of Microsoft Corp. HP is a trademark of Hewlett-Packard Co. IBM is a registered trademark of International Business Machines Corp. Sun is a trademark of Sun Microsystems, Inc. NCR is a trademark of NCR Corp. Sequent is a trademark of Sequent Computer Systems, Inc. Tandem is a registered trademark of Tandem Computers, Inc. Digital is a trademark of Digital Equipment Corp. Oracle is a registered trademark of Oracle Corp. Informix is a registered trademark of Informix Software, Inc. Sybase is a trademark of Sybase, Inc. ©1993 TI. Caruso/THE BETTMANN ARCHIVE. Etta James courtesy of De Leon Artists.



lighting and appliance company has decided to centralize its WAN strategy and purchasing muscle at the same time that it encourages decentralized decision-making and migrates to an increasingly distributed-computing environment.

**T**he network should look as much like a wire as possible. That network is a superhighway, and everyone should plug into that highway."

—Heidi B. Heiden

Each of GE's 12 businesses currently operates with its own separate profit-and-loss balance sheet—and separate WAN management. "Our objective is to integrate all those networks into a single, integrated, multiprotocol network," says Marchese, who works at GEIS headquarters in Rockville, Md. Marchese is pushing GE businesses into sharing backbones, circuits, hardware, software and people.

With the exception of emphasizing Novell IPX, interconnections to SNA networks and TCP/IP backbones, Marchese won't dictate WAN strategies to any GE business. Instead, he encourages each business to use whatever works for each situation. For instance, he encourages the use of both frame relay and leased lines—depending on the situation. If there are small amounts of data traffic among several locations, he encourages frame-relay transmission. If there's lots of traffic between fixed locations, he encourages the business to use leased lines. "It's really a matter of [matching] requirements and design with the most-effective solution," he says.

Marchese also uses the wear-what-fits approach when it comes to working with vendors. Like many of his CIO counterparts on the data side, Marchese doesn't want to be locked into single-vendor solutions. GE is looking to qualify several hub, bridge and router manufacturers. So while Marchese is helping GE migrate to distributed architectures and focus on fewer WAN solutions,

he wants to work with multiple vendors. "We don't like to have proprietary solutions," he says.

Finally, Marchese wants GE to remain open to alternative and developing WAN strategies. He believes ATM holds considerable promise for

his organization. And once GE has nailed down its WAN requirements in 1994, he'll be open to outsourcing part of the company's wide area management. "If we found a vendor that could do this entire thing for us," he says, "we'd outsource the entire wide area network."

## AmeriGas Propane Inc.

### *Converting to frame relay*

**W**HEN AMERIGAS PROPANE, a retail and wholesale provider of liquid fuels, purchased CalGas in 1987, it faced a tough IS dilemma. AmeriGas, based on the Eastern Seaboard, had been outsourcing its IS work. CalGas, on the other hand, had an active data center in Rancho Cordova, Calif. Instead of outsourcing all of its IS functions or moving them back East, the newly unified company kept its headquarters in King of Prussia, Pa., and left its IS operation and data center 3,000 miles away in California.

AmeriGas, with 600 retail locations in 40 states and close to 10,000 employees, linked its dual, transcontinental headquarters and IS operation with two dedicated lines leased from AT&T. For the past several years, AmeriGas Propane has been using those two lines, and another leased line between California and Houston, to transmit accounting and

billing data resident on an IBM 4361 mainframe in California. The leased lines "gave us the capability to stay out West," says William Osinga, MIS technical-support manager.

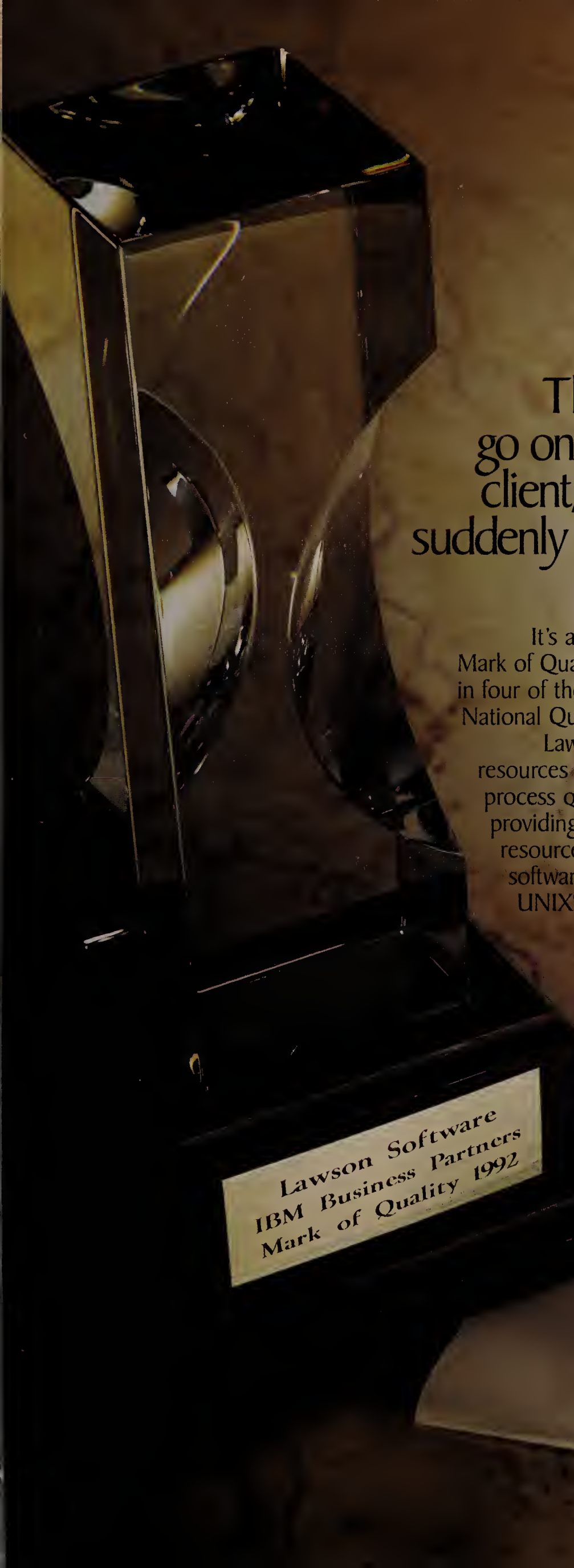
But AmeriGas needed to consolidate separate databases that existed in three regions around the country. There were three distinct, mission-critical distribution systems running on PC systems in Wyoming, Ohio and Texas. AmeriGas Propane decided to migrate all systems to the Digital Equipment Corp. VAX platform—a migration that will be complete in a little under a year.

At first, AmeriGas considered using leased lines between all locations, but the cost of service was high, and new acquisitions this year increased the number of points in the company's distribution backbone, making that option prohibitively expensive. With the number of backbone points increasing and AmeriGas's data transactions growing to 15,000 per month, the company decided to use AT&T frame-relay packet-switching services. The company uses a nightly database polling system for its retail locations and is considering frame-relay packet-switching services to link retail locations with the backbone. The AmeriGas wide area strategy "will allow us to have all our applications on one network," says Osinga.

In that way, AmeriGas knew it could connect multiple offices with redundant links. The company's DECnet LANs connect to the packet-switched network at different speeds. "Frame relay allows for multiple redundant connections," says Osinga. "If you had a leased line, you'd need hardware and the physical line for every single location." Instead, AmeriGas uses a single Cisco router at each location. If Osinga needs another circuit to link up with another location, he simply reconfigures the router.

When AmeriGas completes its conversion away from the IBM platform, all three leased lines will be scrapped. The move to several DEC LANs and a frame-relay WAN strategy "is going to give us a better way





The company that could  
go on for days about rightsizing,  
client/server and open systems,  
suddenly finds itself at a loss for words.

It's a proud moment. Because to win the 1992 IBM Mark of Quality Award, Lawson Software had to score highest in four of the seven categories used in the Malcolm Baldrige National Quality Award process.

Lawson was rated first in the areas of leadership, human resources development and management, management of process quality, and customer focus and satisfaction. All while providing its clients with full-featured accounting, human resources, distribution, retail and materials management software applications for the AS/400®, RS/6000® and other UNIX® systems.

For more information, call  
1-800-477-1357, ext. 853.

**LAWSON**  
Software

UNIX is a registered trademark of UNIX System Laboratories, Inc. RS/6000 and AS/400 are registered trademarks of International Business Machines Corporation.

Lawson Software  
IBM Business Partners  
Mark of Quality 1992

~~We'd like to begin by saying~~  
~~When we first heard about the Mark of~~  
~~Quality Award we~~



to more-efficiently cost our fuel products," says Osinga.

AmeriGas IS officials see another advantage to frame relay: Osinga can increase the bandwidth he needs without changing hardware. And because he's serving an industry that's seen its fair share of mergers and acquisitions, Osinga just might need that extra bandwidth.

## Salomon Inc.

### *Waiting for ATM*

**A**T NEW YORK-BASED Salomon Inc., Senior Operating Officer Heidi B. Heiden is trying to move X.25, SNA and asynchronous traffic onto a TCP/IP network. The financial-services company's goal is to provide a single, common, end-to-end, user-to-user service that's easy for anyone in the company to use. "The network should look as much like a wire as possible," says Heiden. "That network is a superhighway, and everyone should plug into that highway." (Heiden was an early proponent of TCP/IP in the early 1980s, helping to make the protocol a standard for the military and for ARPAnet.)

It's been a long haul to build that superhighway. Like many companies, Salomon's network started out linking the pieces of a centralized computing strategy. But LANs began popping up in individual departments and locations, and Salomon found that it needed to build an internetwork that all employees could use. Easy access could give Salomon a competitive edge. "Wall Street is a very information-dependent business," says Heiden. "The time value of information is critical."

In the New York metropolitan area, Salomon links five buildings (plus an IS facility in New Jersey) using Ethernet-based networks and TCP/IP and routing technology. There are nearly 7,000 nodes in the New York-New Jersey area alone. Salomon ships 100 gigabits of data daily on the New York-area backbone. And that



HEIDI HEIDEN: "I simply want high-speed bandwidth on demand."

amount represents close to a 50 percent increase in traffic in the past two-and-a-half years.

Salomon plans to consolidate operations into two New York locations (plus the New Jersey operation) in the coming months. It also plans to migrate away from an internetworking strategy that relies on a routing and leased-line philosophy. Heiden, instead, wants to move his company to an ATM packet-switching approach.

This will allow Salomon to treat its internetwork as a meshed whole, with each LAN operating as a separate node. The company already uses some frame relay to link non-Salomon client locations with the corporation. Heiden would like to be able to use ATM for all Salomon office-to-office communications in the United States.

Heiden believes that Salomon's internetwork will become easier to use when ATM technology is more readily available and competitively priced. That's largely because ATM, which cuts up data into several small

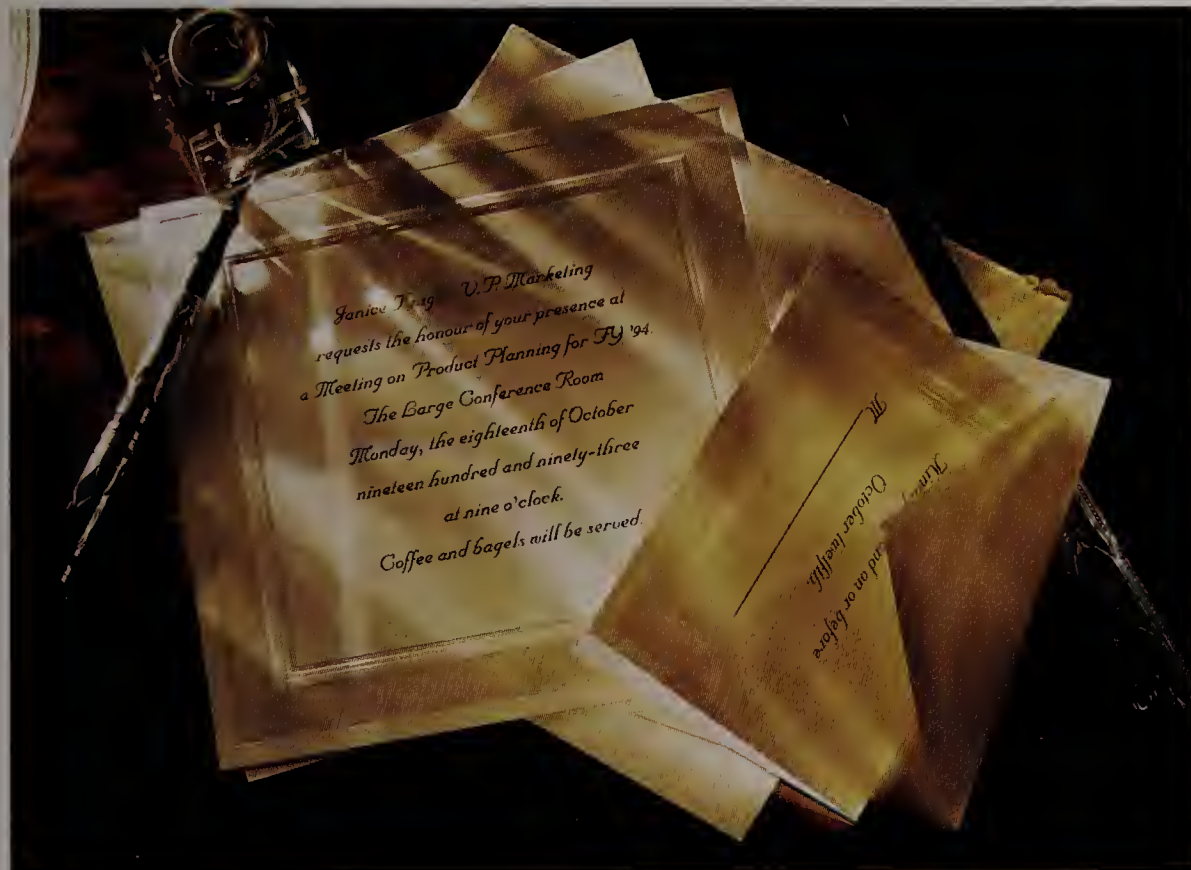
packets, can run data, compressed video and digitized voice at the same time. Heiden hopes to use ATM mostly for internal connections—such as linking locations in the New York headquarters region. "It's not until ATM comes along that we'll look like a wire," he says. He hopes that will happen some time next year.

If Salomon begins to use ATM internally, then Heiden will go to the major transmission carriers to link far-flung locations. Heiden says he will never dictate point-to-point methodology to a carrier. "I want to continue to be the systems integrator and provider on our internal network," he says. "Then I want to outsource our external connections. I don't care what they use. They can use donkeys for all I care." And he adds, "I simply want high-speed bandwidth on demand." ☐

*Charles Pelton, a business and technology writer and editor, runs FTP Associates in Oakland, Calif., a full-service information packaging company.*



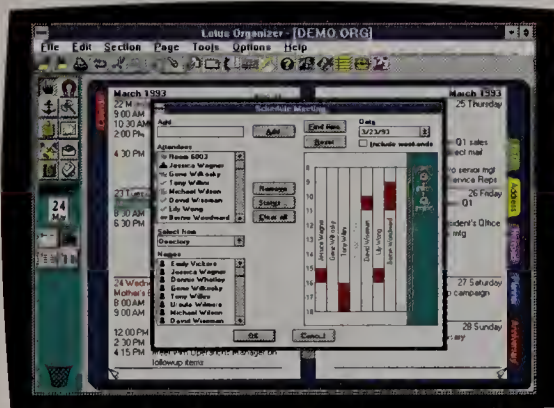
# EXACTLY WHAT DO PEOPLE NEED THESE DAYS TO GET THEM TO COME TO A MEETING?



## INTRODUCING ORGANIZER 1.1 WITH GROUP SCHEDULING.

If you've ever tried to pull a group meeting together you know all too well how frustrating it can be. Now Lotus Organizer™ 1.1 Personal Information Manager for Windows™ works across your existing ccMail™ network to make organizing a meeting – as well as organizing your day – easier than ever.

You simply choose who you want to attend from the mailbox list. Organizer shows you a graphical view of busy and free times so you can pick out the optimal meeting time. Then Organizer delivers an invitation via ccMail. Invitees can accept, decline or delegate to someone else – with a single mouse click. Organizer tracks responses automatically. No chasing people down in the halls. No phone tag. Just the easiest way ever to plan a meeting.

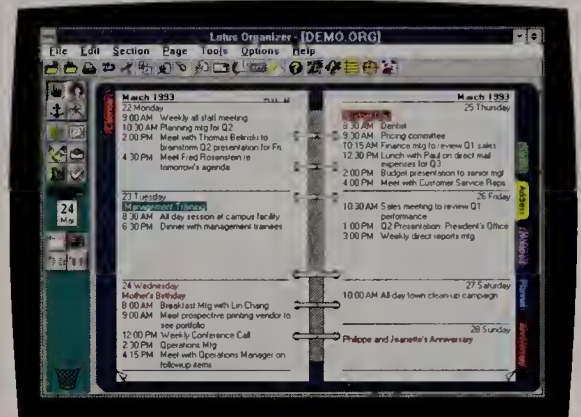


*Lotus Organizer with group scheduling takes the guesswork – and the footwork – out of meeting planning.*

## FOR LAN ADMINISTRATORS, NO OTHER SCHEDULING SOLUTION IS NEARLY SO INVITING.

For starters, Organizer uses existing ccMail directories to simplify installation. Invitations can be sent to anyone on the network, even if they don't use Organizer. And because Organizer's group scheduler displays a user's *availability only*, not the entire schedule, security and privacy are protected.

Both Organizer and ccMail have exceptionally friendly Windows interfaces – help calls are minimal, and your life is made a little easier.



*With an on-screen calendar, a to-do list, an address book, a note pad and an anniversary reminder built into one package, Organizer is a powerful personal tool that's fun to use.*

## ORGANIZER DOES MORE THAN PLAN MEETINGS.

Organizer 1.1 includes all the personal management tools that made Organizer 1.0 the best product of its kind for Windows. Essentially, Organizer is a day planner – a *really* smart day planner with the ability to link related tasks, names and phone numbers. It is an on-screen calendar, a to-do list, an address book, a note pad and an anniversary reminder, all rolled into one. Organizer will even sound an alarm to remind you of a commitment – like that meeting you're invited to.

Find out more about how Organizer could work for your organization, call **1-800-872-3387, ext. 9166**, or visit your Lotus Authorized Reseller. No invitation necessary.

**Lotus**  
Working Together®



Up until now, things have been moving pretty slowly.



IBM and RISC System/6000 are registered trademarks and AIX/6000, POWERstation, PowerPC, POWERserver and POWER2 are trademarks of International Business Machines Corporation. UNIX is a registered trademark of UNIX Systems Laboratories. Windows is a trademark of Microsoft Corp. Wabi is a trademark of Sun Microsystems, Inc. Macintosh is a registered trademark of Apple Computer, Inc. SPEC is a trademark of Standard Performance Evaluation Corporation. © 1993 IBM Corp.



We thought we'd pick up the pace.

## Meet the first PowerPC-based RISC System/6000.

It's more than an introduction. It's a revolution. The price/performance leader of UNIX® systems—IBM's RISC System/6000®—has joined forces with the most exciting chip ever created—the new PowerPC 601™—to create the POWERstation™ 250.

The 250 sets a new standard for performance. Suddenly, engineering and scientific programs, application development and more take place at lightening speed. There are thousands of proven solutions available for the commercial-strength AIX/6000™ operating system. And with Wabi™, you'll soon run Windows™ apps at blinding speed as well. Plus Macintosh programs in the near future. There's more. We're also launching POWER2™, the industry's most powerful RISC technology, in the new POWERserver™ 990—delivering unprec- edented processor performance. We're delivering the first complete DCE for advanced client/server solutions as well.



RISC System/6000

|              | Price     | SPEC™int92 | Cost/SPECint92 |
|--------------|-----------|------------|----------------|
| IBM 25T      | \$9,390   | 62.6       | \$150          |
| HP 715/33    | \$9,990   | 24.7       | \$404          |
| DEC 300L     | \$7,920   | 45.9       | \$173          |
| IBM 990      | \$147,800 | 126.0      | \$1,173        |
| HP 160       | \$136,530 | 82.0       | \$1,665        |
| DEC 4000/610 | \$131,728 | 94.6       | \$1,392        |

And we've brought

technologies like multimedia and object toolkits to RISC. The future will see PowerPC and POWER2 technology in everything from notebooks to supercomputers. If you're ready for a real change of pace, call 1800 IBM-6676, ext. 669 today.

**Power for a new age.**









# POSTMAN'S

## PROGRESS

Technology has forged a Faustian bargain with mankind—making our lives easier while it saps our souls, erodes our social structures and drowns us in useless information. Social critic Neil Postman expounds on the hidden price of progress.

BY LEW MCCREARY

**I**f you were casting the remake of *Moby Dick*, Neil Postman would make an excellent Prophet Elijah—the doom-struck seer on the docks of Nantucket who unsuccessfully warns Ishmael not to sail with Captain Ahab's ship. But where Herman Melville's Prophet was gloomy, Postman—who chairs the Department of Communication Arts and Sciences at New York University—comes across as a cheerful dissenter. Fronting a serious and complicated dislike of modern culture's heedless embrace of technological "progress," Postman wears a broad, slightly gap-toothed grin and wields a ready sense of humor. (After the third telephone interruption in five minutes he declares, "I'm not gonna pick this thing up anymore.... You see, it's just too

much information, and I can't handle it.")

He also manages the neat trick of maintaining a possibly irrational confidence that it's never too late to recover, that even the most-terrifying brink can be turned away from—providing his and others' thoughtful and diligent warnings are heeded.

As a professor, social critic and author of some 18 books (including *The Disappearance of Childhood*, *Amusing Ourselves to Death* and *Teaching as a Subversive Activity*), Postman has achieved a prolific career in this role of professional conscience. With a trenchant and eloquent message of warning, he rains on parades and pulls the emergency-brake cord on runaway trains. In *Technopoly*, published in 1992 (and in paperback by Vintage Publish-



ing in 1993), Postman argues that society perilously ignores the very real costs that technology exacts upon culture. The increasing exaltation of technology has come at the expense of social institutions—schools, religion, the courts, the family, the political parties—that once made sense out of life by functioning as filters of information. But now, says Postman, information has swamped us. Instead of unambiguous improvement, technology has brought intensified chaos and noise, eroded our trust of traditional social institutions and undermined our sense of life's meaning.

Despite technology's manifest benefits, Postman writes, its uncontrolled growth "destroys the vital sources of our humanity. It creates a culture without a moral foundation. It undermines certain mental processes and social relations that make human life worth living. [It] is both friend and enemy."

*CIO* Managing Editor Lew McCreary recently spoke with Postman in his office at NYU.

**CIO:** *What's a technopoly?*

**POSTMAN:** Well, first of all, it's a word that I made up from technology and monopoly. But I meant it to refer to a culture that has submitted all of its social institutions to the sovereignty of technology and, in doing so, rejects, just about wholeheartedly, all of the traditional accoutrements and beliefs from older forms of culture.... It is a culture that believes generally that human progress and technological innovation are the same thing. And, so, if we pursue technological growth and development, we can achieve happiness and equanimity and, maybe, paradise.

I distinguish a technopoly from a technocracy, describing technocracy as a culture—like we had in the 19th century in America—that has technology and in which technology is important but has not completely defeated the more-traditional sources of authority and social organization. [In a technocracy,] traditional culture and technological culture compete with each other. There's a tension between the two. Both are still forces in the everyday life of people and in their psychic equipment.

When you move into a technopoly, traditional culture becomes completely irrelevant.



**CIO:** *You talk about technology overwhelming society's defenses....*

**POSTMAN:** There are so many technologies that make available information in our culture that, for the first time in our history, human beings are faced with a problem not of information scarcity, which can threaten people's survival, but of information glut. Which can also threaten their survival—at least their psychic survival.... Certain social institutions have always existed to help people know what sort of information they ought to pay attention to and what sort of information they can disregard.

[These traditional institutions have provided] a world view and a sense of what is relevant and what isn't, which then helps people control and manage the flow of information. [For example, in religion,] the



Bible itself is interpreted to give people instruction on what words they can and cannot say, on pain of blasphemy, and what ideas they can and cannot entertain, on pain of heresy. The Bible is full of instructions on what you can read and listen to, and how you are to speak. And, of course, universities also have traditionally served to tell people what is relevant and irrelevant. A college catalog is, in a sense, an information-management instruction kit because what's in it tells people what is worth knowing; and what is *not* inside it tells them what is not worth knowing.

Now, two things are happening at once. First, the tremendous increase of sources and amounts of information.... But also the weakening of social institutions that normally act as a kind of immune system against too much information.... I think we really do have a very serious problem in our culture right now with not knowing what to do with all the information.

**CIO:** *Do you think it's possible for a society to craft for itself new defenses that would be adequate to control the new volume of information?*

**POSTMAN:** I certainly do. And it's a must. One of the things that schools will have to try to do—and even as we speak, some schools are trying to do—is, instead of making school an institution for the dissemination

**“The long-range contribution of the computer may be to become our main instrument for getting rid of unwanted information.”**

of information (which is really not needed in a culture like this anymore), teachers are trying to work out methods and materials to make school a place where kids can learn how to control information. [Postman and co-author Steve Powers have a new book out called *How To Watch a Television News Show*.] So, school can be transformed into a social institution that addresses this problem.

I think—just as a sort of aside—that the renewed interest in religious fundamentalism is, in part, a response to the fact that people are yearning to find guidelines for handling all the stuff that's coming at them. Of course, our political parties, which used to be social systems to help guide people in their world views, seem to be breaking down very quickly; I don't see that they're going to be useful in the future.

But I think that we will need to develop new social institutions—and I think we're capable of doing that—which will function as a kind of information immune system.

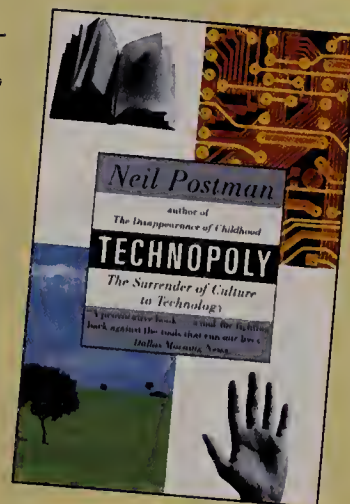
**CIO:** *Do you think technology itself can be brought to bear on the problem?*

**POSTMAN:** There's a wonderful book called *The Control Revolution*, by James Beniger, which takes the view that many of the technologies invented in the

## The Atomic Weight of Knowledge

I should like to give here only one example of how technology creates new conceptions of what is real and, in the process, undermines older conceptions. I refer to the seemingly harmless practice of assigning marks or grades to the answers students give on examinations. This procedure seems so natural to most of us that we are hardly aware of its significance. We may even find it difficult

to imagine that the number or letter is a tool or, if you will, a technology; still less that, when we use such a technology to judge someone's behavior, we have done something peculiar. In point of fact, the first instance of grading students' papers occurred at Cambridge University in 1792 at the suggestion of a tutor named William Farish. No one knows much about William Farish; not more than a handful have ever heard of him. And yet his idea that a quantitative value should be assigned to human thoughts was a major step toward constructing a mathematical con-



cept of reality. If a number can be given to the quality of a thought, then a number can be given to the qualities of mercy, love, hate, beauty, creativity, intelligence, even sanity itself. When Galileo said that the language of nature is written in mathematics, he did not mean to include human feeling or accomplishment or insight. But most of us are now inclined to make those inclusions.”

*From Technopoly: The Surrender of Culture to Technology, By Neil Postman, Vintage Books (New York), 1993, 222 pages, \$11.*



**They'll claim their systems  
have open architecture.**

**Are fully compatible.**

**Are easily upgradable.**

**And that they'll protect  
your investment.**



# And you thought Pinocchio had a problem.

When it comes to stretching your videoconferencing investment, our competition could be stretching the truth. Because the fact is, only VTEL has full functionality and outstanding investment protection.

## Total communication freedom.

VTEL's MediaConferencing™ lets you take advantage of every medium to provide true Communication Without Boundaries.™ Finalize projects faster by working with your colleagues on a single computer document, even while participating in a full videoconference. Exchange any digitized document and make notes on it in real time using VTEL's easy-to-use Pen Pal Graphics® tablet. And when time zones or schedules don't permit a live conference, leave a message with VideoMail™.

## Complete investment protection.

Our truly open architecture ensures that every VTEL system can grow with your needs. And because the entire VTEL line is software-based,

upgrades are as easy as inserting a floppy disk. Plus, all VTEL systems conform to ITU-T (CCITT) standards, so VTEL systems are also compatible with standards-compliant systems from any other manufacturer.

### The VTEL Advantage

|                                         | VTEL | PictureTel | CLI |
|-----------------------------------------|------|------------|-----|
| PC-based open architecture              | X    |            |     |
| Up to full T1 bandwidth available       | X    |            | X   |
| Multi-point DocumentConferencing        | X    |            |     |
| Full meeting functionality              | X    |            |     |
| All systems comply with ITU-T standards | X    | X          | X   |

Make sure your videoconferencing system purchase protects your long-term investment.

## Call for your demonstration.

Get nosy and find out the real story, *not some fairy tale*. See for yourself how VTEL MediaConferencing can give you true Communication Without Boundaries. For a live VTEL system demonstration, call today.

**1-800-856-VTEL**

Please refer to CIO11193.

All VTEL products are proudly made in America.

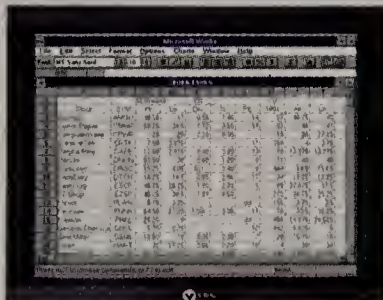
VTEL BK 125 System with Picture-in-Picture



The VTEL BK series is also available with dual 27" or 35" monitors.



VTEL MediaConferencing systems' ultrahigh resolution is perfect for applications that require the utmost clarity.



VTEL ComputerConferencing allows colleagues to work on a single document at the same time.



DocumentConferencing lets you make revisions on-screen with an easy-to-use pen-based control tablet.



Get personal videoconferencing with the DeskMax.™



**TEL**

COMMUNICATION WITHOUT BOUNDARIES





last 20 to 30 years are devoted almost exclusively to the problem of how to control information. And it is possible that the computer, which most people associate with what they would call the beginning of the information explosion, may actually be the end of the information explosion.... What some people tend to think of when they think of the computer is a technology that can increase the amount of information, the speed of information, access to information. In point of fact, the long-range contribution of the computer may be to become our main instrument for getting rid of unwanted information.

**CIO:** *There's apparently a trend in some Japanese businesses nowadays to restrict rather than amplify the flow of information around decision-making questions. I don't know how thoroughly this practice may have penetrated American businesses, but I know there's at least a*

*widespread understanding that our ability to gather vast quantities of information is a disadvantage as well as an asset, and that it can clog rather than effectuate decision-making.*

**POSTMAN:** Absolutely.

**CIO:** *So, do you think the Japanese are in recovery from technopoly?*

**POSTMAN:** Well, the Japanese are interesting because, within the past two decades, it seemed that their culture was hell-bent on becoming the world's leading technopoly. But there have been some very serious side effects that the Japanese appear to be flexible enough to respond to. They've discovered that the way they've organized their workforce, for example, is leading to psychic and mental disturbance; the way they've organized their education system seems to do the same. And one hears an awareness of such things and attempts to respond to them coming from Japan. And that's very encouraging. If, as everyone says at the moment, the Japanese economy is in decline, I expect that they will be able to make a sort of response which will identify sources of the difficulty and then, perhaps, make

changes that will resolve the difficulties.

For some reason, American culture appears to be less able to do that, in part because of the American lust for the new. We're obsessed with getting new things and getting rid of old things. Many of these old things are valuable to the culture, and I don't know if we can restore them, get them back.

One of the key questions that you should ask when you're thinking about a new technology is, "what is the problem to which this technology is an answer?" Now, speaking of the Japanese, I bought a new Honda not long ago, and the American salesman wanted me to have cruise control. So I asked him the question: "What is the problem to which cruise control is the answer?" And he said, "Well, keeping your foot on the accelerator." And I said that I'd been driving for 35 years and had never found this to be a burden....

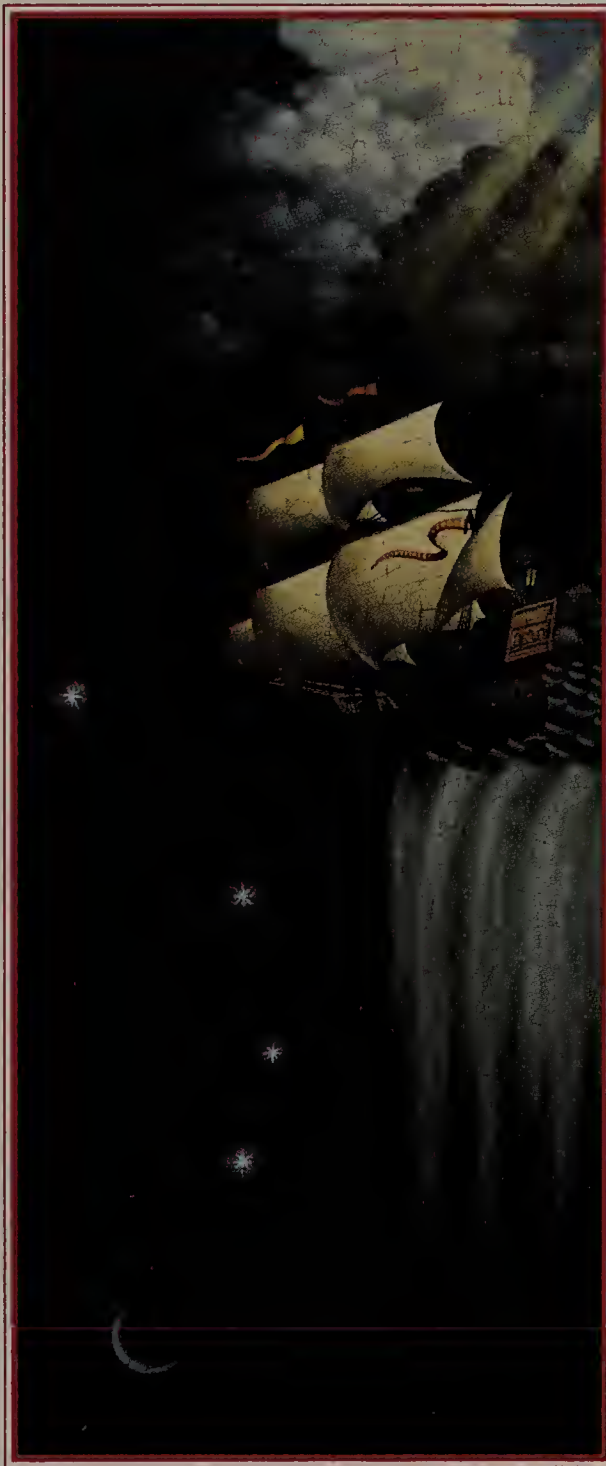
Well, normally, Americans don't respond in this way.



## WHAT WOULD HAPPEN IF YOU CHOSE THE WRONG PROJECT MANAGEMENT SOFTWARE?

It might not be the end of the world, but it would make your job a whole lot tougher. You'd be worried about how to install it, how to train your staff to use it, whether the company you bought it from was even going to stay in business. You'd realize that the company behind the software is just as important as the software itself.

Lucas Management Systems can keep you from drifting off in the wrong direction. With nearly \$100 million in annual sales and 1,200 corporations as customers, we sell more project management software than anyone. And we offer more support too. Training. Consulting. On-site technical support from 40 locations around the world.



As the world leader, we have the experience and the expertise to match the software to your project for a perfect fit. Not just because we've done it for companies like Chrysler, Lockheed, Lufthansa, and other major corporations, but because we listen to you and your requirements.

We know the best project management software makes it easy for everyone on your project to work together. That's why we're the only company offering software that runs on virtually all platforms from mainframes, minicomputers, and workstations to standalone and networked PCs and Macs.

If you're looking for a company that'll do a lot more than just ship you the software and leave you hanging, give us a call.

*Artemis*

From Lucas Management Systems

PROJECT MANAGEMENT SOFTWARE TO MAKE THE WORLD GO 'ROUND

1 800-4-PRO-MGT







# You have a reservoir of information.

## How much is reaching your customer and how fast?

If your customer only knew you offer a product he wants. If your customer only knew you offer a service she needs. If your customer only knew what you know. And fast. Because what your customer doesn't know leaves revenue-generating potential untapped.

That's why Unisys has developed a powerful new initiative to help give business the advanced customer service crucial in an increasingly competitive environment—CUSTOMERIZE.

Unisys can help CUSTOMERIZE your enterprise by extending information technology out to the field locations, where a customer decides to do business with you—or not. And where your single most important influence over

that decision may be information. When the flow of information is comprehensive, you optimize customer satisfaction and increase sales content. With a timely flow of information, you not only boost the speed of transactions but also sharpen your competitive edge.

A CUSTOMERIZED enterprise draws information from customers even as it conveys information to them. Circulating through your organization, it all helps productivity, control and profitability.

Ask us about our CUSTOMERIZE<sup>SM</sup> assessment, which teams you with

experienced Unisys consultants to evaluate your organization's information flow. Ask, too, for a complimentary CUSTOMERIZE Information Kit.

**cus-tom-er-ize** \ kūs'-tə-mə-rīze' \ *vt*  
**1:** to make a company more responsive to its customers and better able to attract new ones **2:** to customize an organization's information strategy, e.g., to extend systems capabilities to field locations and other points of customer contact and support **3:** what Unisys Corporation does for a growing roster of companies, and government agencies, worldwide **syn** see CUSTOMER SERVICE, COMPETITIVE EDGE, BUSINESS-CRITICAL SOLUTIONS, REVENUE GENERATION

**UNISYS**  
We make it happen.

Call us at 1-800-874-8647, ext 13.  
Discover how Unisys can help you CUSTOMERIZE your enterprise and convert information into a stream of customers—and revenue.



I mean, he thought I was a little kooky guy, because he assumed that any American consumer would [believe] that those technological innovations represented progress.

**CIO:** *But don't you think the benefits of technology are valuable and important in their own right?*

**POSTMAN:** Well, I make that point at several places in my book....

**CIO:** *No, you're not a classical Luddite [a reflexive opponent of technology, named for Ned Ludd, leader of a guild of traditional hand-weavers who rebelled against progress by smashing newfangled mechanical looms]....*

**POSTMAN:** No, no, no. Actually, in a way, I'm not a Luddite at all. Because I'm not for busting up anything. I'm for our exhibiting some control.

As a matter of fact, you know, the Luddites did their business in the early 19th century, and they had some pretty good complaints. They were trying to preserve a style of living that had many good points to it and that the factory system was not taking into account. The Luddites probably would not have had to bust up the textile machinery if someone had prepared [them] for the new technologies from a social and psychological point of view. Someone could have said, you know, "There will be great advantages to the new machinery, but we understand what's going to be lost. And through social policy, or even political action or education, we can minimize the negative consequences."

And I do believe that every technology has or brings advantages. But I also think every technology brings disadvantages.

I mean, suppose it were 1904 now, and we knew in 1904 what we know now about the automobile.... There'd be plenty of disadvantages. Our air would be poisoned; our cities would be choked with traffic; the beauty of our natural landscape would be destroyed. Now in 1904, no one thought about this. Even when television came in, and radio before it, no one thought about these questions.

I like to think that television should be the last technology that will come into our culture mindlessly, where no questions were asked. With the computer, I think, we have to ask a lot of important questions.

**CIO:** *Are we at a point where it's still timely to ask these questions?*

**POSTMAN:** Well, I don't know. In a way, all my book is about is getting people's attention on this question.

People ask, who could be against the computer? But we do have to ask ourselves some fundamental questions. Even now, President Clinton and Vice President Gore are very enthusiastic about this \$50 billion information highway. Well, let's just ask them: What's the problem to which this \$50 billion highway is the answer? If they say, "Well, there is really no problem. But new technology fuels the economy." Well, that's an answer of sorts. But if they say, "The problem is that people don't have access to enough information," that's just nonsense. Because everyone does. And besides, information [or lack of it] has almost nothing to do with our major problems....

What I'm interested in is having people take these questions seriously.... Technology is not an unmixed blessing. Everyone seems able to talk about what a new technology can do—that's fine. But we also need for them to talk about what new technologies can *undo*.... I just don't think we can go into these things anymore with our eyes closed. We have to make attempts to speculate about some of the disadvantages and make preparations for them.

**CIO:** *You write in your book that various technologies have "usurped powers and enforced mindsets that a fully attentive culture might have wished to deny them." What's an example?*

**POSTMAN:** Well, there are a lot of examples. But let's take television. It's a wonderful, awesome technology.

But I think we could have guessed, in 1946 or '47, that one of the consequences of this new technology would be to erode the difference between childhood and adulthood. It was abundantly clear that because of the nature of television, there was no [longer any] way to keep secrets from any age group in the culture. In other words, this is a medium that makes information available simultaneously to everyone in the culture, irrespective of age or gender or anything else. I think we could have worked out the implications of that....

Once a technology comes into a culture, it doesn't affect just one system. Medical technology is a good example: The insurance companies get involved; the legal system is implicated. I mean, even on a question such as what does it mean to say that a person is dead—that's made into a somewhat more problematic question than it once was.

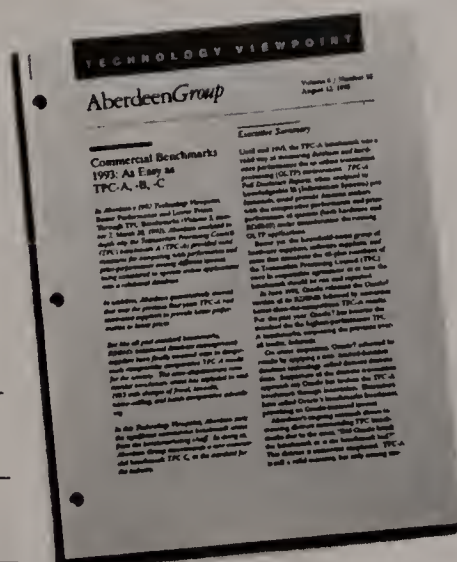
Technology is never just unidirectional in a culture; it's more an ecological issue. If you put a drop of red dye into a beaker of clear water, after a minute or so, you don't have the clear water plus a spot of red dye; the coloration of every molecule in the water is changed. **CIO**

**"I like to think that television should be the last technology that will come into our culture mindlessly, where no questions were asked. With the computer, I think, we have to ask a lot of important questions."**



# Send It To Me.

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Company \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_  
State \_\_\_\_\_ Zip \_\_\_\_\_  
Phone \_\_\_\_\_







NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

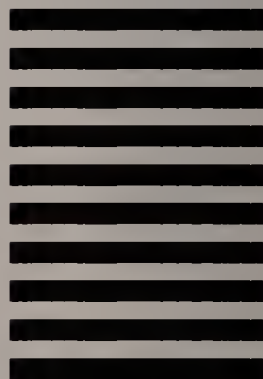
**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 25 MENLO PARK, CA

POSTAGE WILL BE PAID BY ADDRESSEE



Informix Software, Inc.  
Aberdeen Report  
4100 Bohannon Drive  
Menlo Park, California 94025-9905





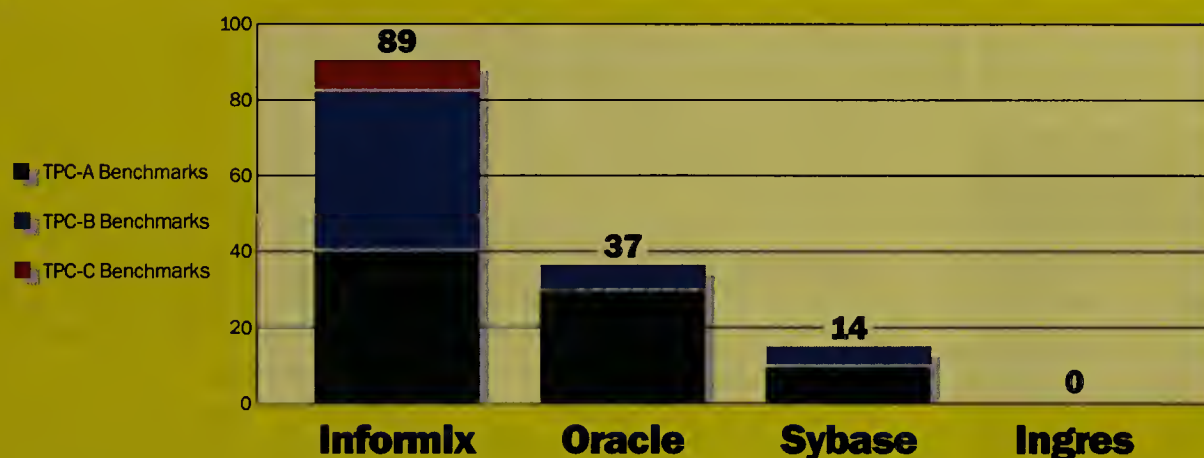
Send For A Free  
Aberdeen Group Report.

## TPC Benchmarks\* Published to Date.

Hardware vendors that have used  
INFORMIX®-OnLine to publish  
TPC benchmarks include:

- AT&T
- Bull
- Control Data Corporation
- Data General
- Digital Equipment Corporation
- Fujitsu
- Hewlett-Packard
- IBM
- ICL
- MIPS
- Motorola
- NCR
- Olivetti
- Sequent
- Siemens Nixdorf
- Sun Microsystems
- Texas Instruments
- Unisys

\*UNIX TPC-audited benchmarks published by hardware manufacturers as of 9/1/93.



Source: Transaction Processing Performance Council (TPC), 1993.

# For the Best Database Performance, Hardware Vendors Choose Informix.

### INFORMIX-OnLine Features Include:

|                              |                                  |
|------------------------------|----------------------------------|
| ✓ ANSI-standard SQL          | ✓ Optical disk support           |
| ✓ BLOB support               | ✓ Referential integrity          |
| ✓ Disk mirroring             | ✓ Rollback                       |
| ✓ Distributed database       | ✓ Row-level locking              |
| ✓ DRDA-standard DB2 gateway  | ✓ Runtime integrity verification |
| ✓ Incremental archiving      | ✓ Secure auditing                |
| ✓ Integrated DBA environment | ✓ Stored procedures              |
| ✓ ODBC support               | ✓ TP monitor compatibility       |
| ✓ On-line archiving          | ✓ Triggers                       |
| ✓ On-line recovery           | ✓ Two-phase commit               |

When they want to show high performance, hardware vendors choose the database that delivers. Time after time, the choice is Informix. Whether it's TPC-A, TPC-B, or TPC-C, INFORMIX-OnLine provides the kind of benchmark numbers hardware vendors use to prove that their systems provide a competitive advantage.

### High Performance In Demanding Environments.

OnLine is engineered for high performance in heavy transaction processing environments—a fact that's evident in new TPC-C benchmark results. Unlike TPC-A and TPC-B, TPC-C was specially designed to include transaction types that more accurately mirror real-world transaction processing. In other words, TPC-C results are a realistic look at how an RDBMS will perform in your own business. And hardware vendors are using INFORMIX-OnLine to publish TPC-C results.

Informix has been providing information management software for open systems for more than a decade—including UNIX®, NetWare®, and Windows® NT®. With fully scalable, high performance database servers, application development tools, and a range of connectivity solutions, Informix is the choice for dynamic companies.

### Free Aberdeen Group Report.

Find out more about TPC benchmarking and Informix in the new Aberdeen Group Report, "Commercial Benchmarks 1993: As Easy as TPC-A, -B, -C." **Call us at 1-800-688-IFMX, ext. 11 or send in the reply card and we'll send it to you—free of charge.**





# FRONTLINE



BY PORTIA ISAACSON

*The development of small, multi-media communicators is all very fine, but what we really need is a means to identify and extract the messages we want from the flood of those we don't*

*A Telephone for the 21st Century*

## MESSAGE MASTER

I have nightmares of drowning in messages: telephone messages, faxes, E-mails.... I can't find the messages I want in the flood of messages I don't want. My E-mail and voice-mail messages accumulate faster than I can dispose of them. I can't get the valuable stuff filed, much less the junk.

For 20 years we have talked about the convergence of computing and communication. I'm ready. Technology is ready. Yet I sit staring at my personal computer and my telephone next to it—just like 100 million others—and I realize how evolutionary our current thinking about this convergence is. Yes, I use the telephone line for data, fax and E-mail. Yes, I use the computer to store my contact database, dial telephone numbers and generate faxes. But even when I have experimented with exciting new products like National Semiconductor's data/fax/voice card, the convergence feels evolutionary.

It is axiomatic that all new technologies are first used as (and judged by) the technology they replace (we first called automobiles horseless carriages). It is therefore no surprise—but somewhat of a disappointment—that we are focusing on wireless voice, data and fax communications as we reinvent the telephone network.

In recent months, I have felt a bit queasy as I sat through briefing after briefing with AT&T, Motorola, CDPD

(an effort by IBM, the RBOCs and other carriers to develop a standard for cellular digital packet data), ARDIS, RAM Mobile Data, SkyTel and others. Certainly the communication services that these companies are introducing around the new generation of lightweight, powerful nomadic devices (personal communicators, personal digital assistants, subnotebooks) are valuable. But they still only extend the telephone's ability to communicate between two or more places by establishing point-to-point, discrete connections or sending discrete messages. The popular slogan, "Anywhere/Anytime," lies. Anywhere? Yes. Anytime? No. These communication services do not create a connection between people at different times. They merely leave messages that can be read at another time with no

framework for responses or ongoing conversations.

What we need is a direct, interactive messaging device that identifies callers, approximates conversation in the immediacy and seeming real-time nature of its exchanges, and creates a chronological record of the interaction.

With current communication services, the burden of sorting incoming messages, gleaning critical-response addressing, and filing message data by subject or contact is placed squarely on the receiver. There ought to be a law against it! There ought to be a communication service that does it better.

Most communication services have been sender- or caller-centered. Voice mail is a good example. For the caller, it's great: a quick way to leave

an impromptu message (of sometimes ridiculous length) that will probably be heard by the recipient because he or she must listen to at least part of each unsolicited message to get to those that were solicited. And therein lies the drawback for message recipients: Voice mail, E-mail and fax give them no way to manage their communication lives. I foresee a rebellion, or at least slowness in the adoption of new but evolutionary communication services.

I, for one, don't like spending half my time operating a mailroom. We need something revolutionary: a communication service that really does save us time by offering a new method of conversing that transcends time, not just space. Sure, I look forward to the day when I can send a message or converse from anywhere. But I also need a communication service that will let me converse anytime, not just leave messages.

Perhaps because I live with my intensifying nightmare of message overload, I dreamed the solution: the deltaphone.

## Beyond Voice Mail

### TAKING A SLICE OUT OF TIME

Deltaphone is a simple idea that is a superset of telephone. Telephone connects people at different places so they may converse. Deltaphone connects people at different places and different times so they may converse. But doesn't voice mail do that? No, voice mail provides no framework for conversation or collaboration.

Telephone's primary function is to enable simultaneous

**I foresee a rebellion, or at least slowness in the adoption of new but evolutionary communication services.**

**What we need is a direct, interactive messaging device that identifies callers, approximates conversation in the immediacy and seeming real-time nature of its exchanges, and creates a chronological record of the interaction.**



“We were told it was impossible to develop a client/server application without extensive retraining. Then we talked to Micro Focus.”



Larry Lowder, Systems Architect, Questar Service Corporation.

Mountain Fuel Supply®, a division of Questar®, is a utility company supplying natural gas to 750,000 customers across Utah, Wyoming, Idaho and Colorado. The company's success is largely driven by its implicit belief that the customer is number one.

Yet, IT also plays its part in that success: client/server architectures and graphical user interfaces (GUIs) have helped Mountain Fuel Supply move applications and information closer to the customers and the employees. All of which has resulted in an augmented level of service being offered to customers.

When Larry Lowder, one of Questar's Systems Architects, set out to build the client/server architecture for Mountain Fuel Supply, he needed solutions, not skepticism. For the first project, a cashiering system, he needed to link workstations with OS/2® to the DB2® database on the host, running CICS™

“We were faced with having to spend up to two years retraining our

COBOL programmers in C and API calls. Then we discovered Micro Focus Dialog System™. It allowed us to build the client functionality we required, and re-engineer the existing mainframe application as a server.”

“Within a week, mainframe programmers were producing GUI screens for COBOL. Within 90 days we had delivered the system. Now we're not only coming in under budget, but also way ahead of schedule.”

As Mountain Fuel Supply discovered, the Micro Focus solution lets you make a productive transition to client/server without sacrificing any of the resources you've worked so hard to build.

When the world's leading corporations demand “A Better Way of Programming,”™ they turn to Micro Focus. For a brochure on putting the Micro Focus Client/Server Solution to work for you, call 800-872-6265.

**MICRO FOCUS**®

Micro Focus Inc. 2465 East Bayshore Road, Palo Alto, CA 94303. Tel. (415) 856 4161.



# IBM Client/Server



IBM is a registered trademark of International Business Machines. © 1993 IBM Corp.

## How do you get everyone working in concert?

To stay competitive, you're constantly searching for better ways to orchestrate the flow of information. How do you get more out of your PCs? How can you make the most of your existing systems? What can be done to streamline your organization?

More often than not, the answer is IBM Client/Server.

IBM can develop open client/server solutions that put the combined strength of all



your computer systems to work for you. We have thousands of specialists worldwide who can work with you to custom-tailor a solution that's right for your particular business. And we'll work with you at any stage of the process, from initial consulting to helping you tie everything together—we'll even manage your systems for you.

Whether you're upsizing or downsizing, nobody knows how to ensure systems reliability and security for your "mission critical" applications better than IBM.

We can also help you integrate different types of hardware, software and networks.

We have the industry's widest array of software and network products, and we support Distributed Computing Environment (DCE), enabling different computer brands and platforms to work together in harmony.

For more and more companies, IBM Client/Server is the key to getting everyone working in concert. We've done it for hundreds of companies. We can do it for you.

For more information, call 1 800 IBM-0045, ext. 10.

There's never been a better time to do business with 



# FRONTLINE

connection between people at different locations. On the telephone, one person speaks, time passes, and then another person speaks. The time between one person's contribution to the conversation and the other person's is what the speakers perceive as real-time, because the telephone's connection is simultaneous. (I call this kind of conversation a simul.)

Deltaphone offers both connections that are simultaneous and those that are not. In the latter, any amount of time may elapse between the messages of the conversation, and no physical telephone connection is main-

**In a conversation using a delta-time connection, each person can listen to prior messages in the conversation, then add his or her bit and hang up to resume the conversation at a later time, after another person has added a message.**

tained. In a conversation using a delta-time connection, each person can listen to prior messages in the conversation, then add his or her bit and hang up to resume the conversation at a later time, after another person has added a message.

(I call this kind of conversation a delta.) What the user hears is a sequence of messages contributed by two or more people. The messages in the conversation can be separated by any amount of time. The sender hangs up the telephone at the end of each message, so the physical telephone line is not used during gaps in the conversation. However, the logical connection is maintained by the network.

When users reconnect to a delta, they may elect to hear just the last message or any number of preceding messages. When a conver-

sation is played back from start to finish, users hear the conversation with no time gaps, (although they may elect to hear or see the time/date stamps that come before each message).

## *IT Fiction*

### **A NEXT-GENERATION CONVERSATION**

As an example of deltaphone's operation, imagine this situation. It is 2011, and Portia is working as a consultant for Bill, preparing a competitive analysis and a forecast for Bill's network service. Bill is preparing the final presentation for his boss and realizes that he needs a file from Portia. He calls her. Portia is not available for a simul, so Bill starts a delta. Usually Bill prefers deltas because he has found that simul requires a lot more chit-chat; however,

this time a simul would have been nice because he really needs that file.

Bill taps in the delta subject "CA File" to distinguish this delta from the other open Bill-Portia deltas. Bill speaks his message and hangs up. He has selected the "beep me" option for the Bill-Portia CA File delta icon in case he is in the conference room when Portia responds.

Bill waits for several hours, glancing frequently at his display, hoping to see a glowing icon indicating a response to the Bill-Portia CA File delta. He doesn't bother with his other deltas or accept any simul, because he is too busy preparing the presentation. He remembers the horrible days of voice mail when he would not have known if Portia had responded without listening to his other messages.

Portia breaks out of her

client meeting, glances at her deltaphone and notices a glowing icon indicating the new Bill-Portia CA File delta. She has programmed her communicator so that any delta initiated by Bill is high priority; however, she resists taking a beeper to client meetings. She taps on the Bill-Portia CA File delta icon, ignoring the other new deltas, and listens to Bill's remarks. She realizes that she needs a simul with Bill before she can respond to his request, so she taps the simul request button.

Bill, still at his desk, hears the priority-interrupt from his communicator and notices the Bill-Portia CA File delta icon is blinking red, indicating Portia's request for a simul. He accepts; they have a quick conversation and hang up.

Portia shuffles through her network files looking for the information Bill wants. She finds it, selects the Bill-Portia CA File delta, speaks her message, attaches the file, hangs up and scurries back to her client meeting.

Bill's shirt-pocket beeper tickles his chest, indicating that a message has arrived in a priority delta. Glancing at the tiny display, he sees that it is the Bill-Portia CA File delta, so he goes to his office because all the required materials are there. He realizes that if he were not still so fond of paper, he could have processed the message anywhere that he had his communicator. Back at his desk, Bill taps on the glowing icon representing the Bill-Portia CA File delta, listens, responds with a low-priority request, then returns to his meeting.

Two days later, Portia taps on the Bill-Portia CA File delta. She replays the entire





## Enterprise Client/Server: The New Organization

*"There's a revolution going on in  
computing and business. And  
it creates some big issues to think  
about as you move to client/server.  
Changes in organizational struc-  
tures. Re-engineering business  
processes. Integrating legacy  
applications. And maybe  
most important..."*



When Bob Epstein, Executive Vice President and a founder of Sybase, talks about computing and business, people listen. After years of developing client/server products and talking with customers, he's seen what works, and what doesn't. Hear what he has to say in a remarkably candid recorded conversation. For your copy of *"Client/Server And The New Organization,"* call 1-800-SYBASE-1.



# FRONTLINE

sequence of communications to refresh her memory about the conversation. She is always amused as a delta is played back because it sounds like a simul since the elapsed time between messages is not present in a replay. She is grateful, however, for the time/date stamp on each message because some of the messages would not make sense without knowledge of the events that took place between them. She responds to Bill's message by adding her message to the delta.

In his own good time, Bill notices the active Bill-Portia CA File delta, selects it, listens, says goodbye, asks to close this particular conversation and suggests they have a simul some time. Portia selects the active Bill-Portia CA File delta, listens and agrees to close the delta. The Bill-Portia CA File delta disappears from her display. Bill notices that the Bill-Portia CA File delta icon has faded to a dim outline, so he knows Portia has heard his final comments and agreed to close the conversation.

Bill saves the conversation on his communicator's archival PC Card before tapping the icon to release all network records of it.

## *An Anymedia Communicator*

### **SPECS FOR SPECIAL EFFECTS**

A deltaphone looks like a telephone with a display. It is a computer and communicator combined, and it may be wired or wireless. Any computer with telephone capabilities can be made deltaphone-capable by installing the right software and delta-

phone-network support. The telephone numbers of old can be "dialed"; in addition, users can create a delta-time conversation or connect to one of their active deltas by dialing its number (created on the fly by the telephone network) or by simply tapping its icon on the display (the user never needs to know the number).

The icons on a deltaphone user's display representing active deltas can be managed in priority groups or in any way the user elects (given that the software application supports the user's election). Some users may choose to keep certain deltas active for years (e.g., mother, lover). Others may want to limit open deltas to short, simple interactions on one small subject. Deltas provide a new framework for conversation, so their possibilities are as rich as conversation itself.

Deltaphones support voice, data, E-mail and fax, so any message in a conversation can be composed of or include those media. When video becomes an economical and important way to converse, it also should be supported. Each deltaphone user can converse in his or her preferred media. Two people engaged in a delta may use different media (for example, in the Bill-Portia situation, Bill could have used only E-mail and Portia could have used only voice). Because voice, data, E-mail, fax and other media are all within the same delta framework, they are interchangeable even

within one delta. Instead of multimedia, we might think of deltaphones as "anymedia."

## *The Technology Framework*

### **GETTING TO DELTA**

The current telephone network can be transformed into a deltaphone network. The perfect partners for building it would be Microsoft and AT&T: Microsoft for the software in the computer/phone and AT&T for the storage and functionality in the network. Of course, legions of other companies would need to

participate (e.g., RBOCs, PBX manufacturers, network-services providers, software firms), and a few (e.g., MCI, Motorola, Symantec, Lotus) might even be able to provide deltaphone leadership. A deltaphone network is ambitious; however, I doubt it would cost more to develop than today's evolutionary services. Deltaphone requires these extensions to the functionality of the current telephone network:

1. Storage in the network for active deltas (including voice mail, E-mail and fax)

2. The generation and maintenance of delta identifiers

3. The ability to switch to an active delta specified by the delta identifier

4. Network and communicator management of the delta interface options (e.g., playback, time stamping)

5. Security to prevent unauthorized access to active deltas

6. Billing for delta stor-

age, access time and any other delta-specific services

There is no doubt that we will reinvent the telephone network over the next 10 years. As we do, we should remember that what limits the usability of voice, E-mail and fax network services (and network suppliers' revenue growth) is not the number of messages that can be sent but the number that can be received. The key to greater usability of network services is enabling people to engage in network-supported conversations, not just providing them with elemental messaging.

Deltaphone can make voice, fax and E-mail communication more useful by enabling the user to interact at a conversational level rather than focus on the details of sorting incoming messages.

We can think of telephone as removing barriers to conversation along three axes: location, media and time. In the United States, with nearly universal wired-telephone and expanding wireless coverage, we can truly converse from any location. The integration of E-mail, fax and voice has laid the foundation for media-independent conversation. Now it is time to create a technology framework for time-independent conversation. I bet we're going to love it!

If you have questions or answers, please deltaphone me. ☐☐

*Portia Isaacson is president of Dream IT Inc., headquartered in Colorado Springs, Colo., a consultancy and publisher dedicated to providing quality business information to customers and creators of frontline IT.*





# Subscribe And Save.

~~\$78\*~~ **\$59**

Yes, enter my one-year subscription to *CIO* magazine and bill me later for only \$59, a savings of over 24% off the basic rate.

Name

Title

Company

Address

City

State

Zip

The basic one-year subscription rate for *CIO* magazine is \$78.

*\*This is a domestic rate only (Canada & US). The foreign rate is \$175 US.*

AD93



**PROCESS  
IMMEDIATELY**



NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

---

**BUSINESS REPLY MAIL**

FIRST CLASS MAIL PERMIT NO. 1020 FRAMINGHAM, MA

---

POSTAGE WILL BE PAID BY ADDRESSEE

CIO Magazine  
Attn: Circulation Department  
P.O. Box 9208  
Framingham, MA 01701-9486

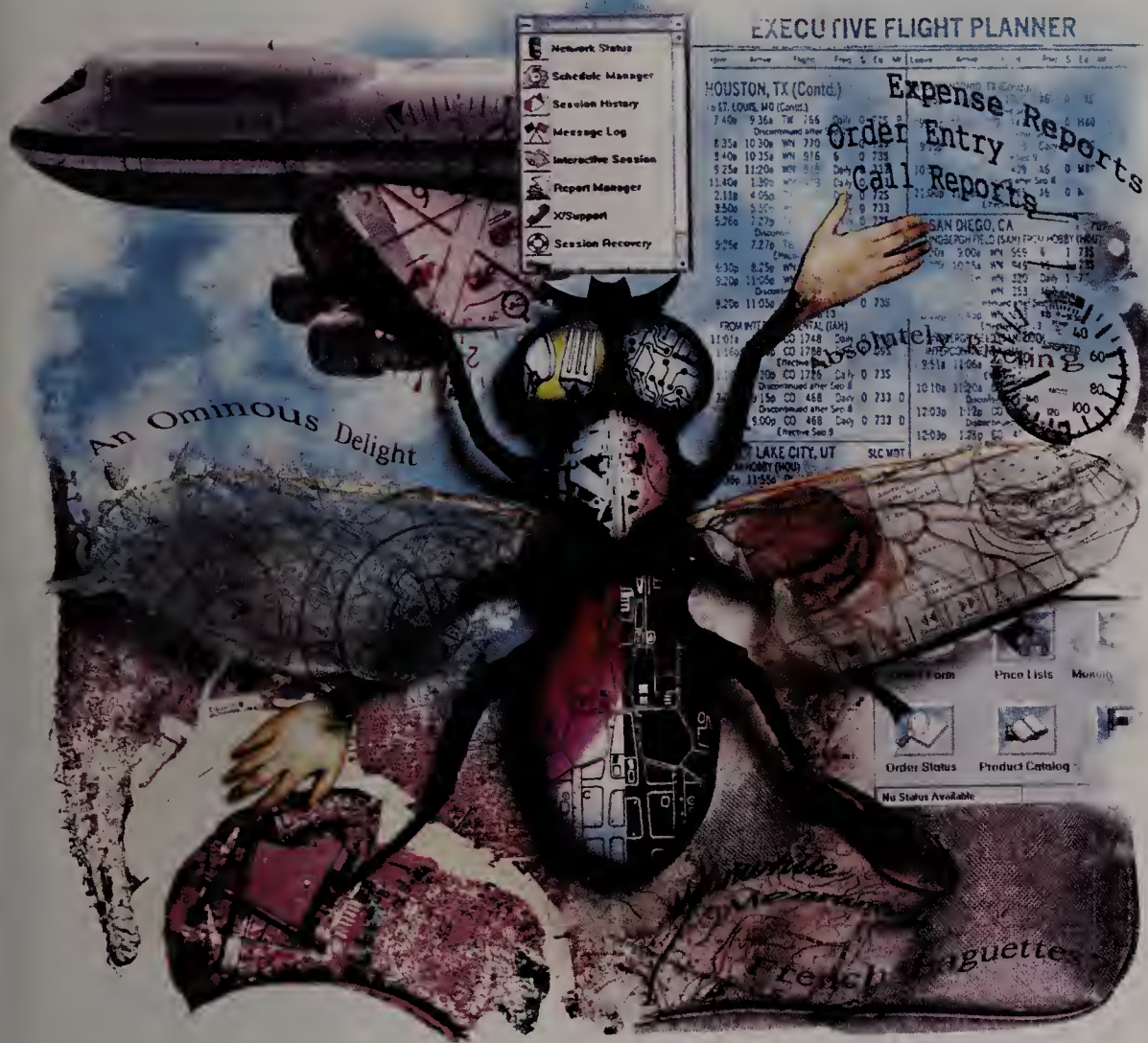




# RemoteWare<sup>®</sup> and the SEMINAR Charlie missed

AT THE VERY MOMENT AN EXPERT WAS EXPLAINING THE COST- AND SANITY-SAVING BENEFITS OF REMOTEWARE-CREATED AUTOMATED WORKFLOW SYSTEMS TO A ROOMFUL OF HIS FELLOW CLIENT/SERVER AFICIONADOS, Charlie was sitting

in a tiny center seat, in coach, staring blankly at a fly nimbly exploring the OXYGEN PANEL above him. It had come down to a scheduling conflict. One more FREE product seminar, half-day, inevitably had deli sandwiches... potato chips that had gotten too close to the kosher dills and gone soggy. Or this junket to clean up yet another set of branch communication difficulties in Opelika, St. Louis, and San Antone. So the picture of this fly on the ceiling RUBBING ITS FRONT LEGS TOGETHER with an ominous delight didn't have the significance for him



it might have had he seen that MEANWHILE, BACK AT THE SEMINAR THE REMOTEWARE FOLKS WERE SPINNING COLORFUL TALES OF SUCCESSFULLY-IMPLEMENTED FIELD COMMUNICATIONS SYSTEMS, HOLDING CHARLIE'S TECHNO-PEERS FROM COMPETING COMPANIES CAPTIVE WITH THE PROMISE OF THOUSANDS OF FULLY-AUTOMATED, EASY-TO-MANAGE AND UNATTENDED DIAL-UP COMM SESSIONS, AND RIVETING ACCOUNTS OF REAL COMPANIES WITH HUNDREDS OF MOBILE CORPORATE LAPTOPS AND REMOTE BRANCH OFFICES USING CENTRALLY-CREATED AND MANAGED ELECTRONIC FORMS, DOCUMENTS, AND REPORTS, ALL LINKED TO CENTRAL SYSTEMS AND DATABASES, AND ALL NEATLY SUPPORTED BY INTEGRAL ELECTRONIC SOFTWARE DISTRIBUTION CAPABILITIES!

So these were the things Charlie was missing: solutions to the very problems that had made this one more night away from home a necessity. That, and what actually turned out to be a delicious RemoteWare lunch of pasta salad, FRENCH BAGUETTES with prosciutto and mozzarella, and fresh strawberries.

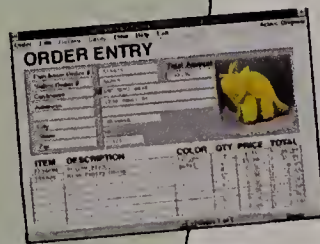
But what did he know?

He was headed to lunch with the fellas in San Antone. For

bad deli sandwiches. And SOGGY CHIPS.

**CALL 1-800-322-3366**

NOW TO RESERVE YOUR FREE REMOTEWARE SEMINAR SEAT IN ONE OF THESE CITIES NEAR YOU: ATLANTA, BALTIMORE, BOSTON, CHICAGO, CLEVELAND, DALLAS, DENVER, DETROIT, EDISON, HOUSTON, KANSAS CITY, LOS ANGELES, MINNEAPOLIS, MONTREAL, NEW YORK CITY, NEW ORLEANS, PHILADELPHIA, SAN DIEGO, SAN FRANCISCO, SEATTLE, SALT LAKE CITY, TAMPA, WASHINGTON, DC



**XCELLENET<sup>®</sup>** Automating remote possibilities.



OPEN

23.79

---

Hours



# How Much Availability Is Enough?

Open 23.79 hours out of every 24 sounds impressive.

But it really means that you're out of business for an hour and a half every week.

That's an hour and a half when you're not making sales, shipping orders, or serving customers – because critical business applications aren't available. Not just outages. Late reports, bad response time, and inefficient applications can all mean a loss of business.

To maintain end-to-end availability and keep applications running well, IS teams in four out of five Fortune 500 companies rely on Candle.

Our customers identify and prevent application problems from a central location, using our industry standard OMEGAMON<sup>®</sup> monitors and OMEGACENTER<sup>™</sup> products for mainframe automation, performance, and control.

In distributed environments, our clients use Candle products to centrally monitor the availability of critical applications on HP, DEC, RS/6000, UNIX, and LAN platforms. And working with IBM, we're using our unique Candle Technologies<sup>™</sup> (CT) to provide systems management solutions for distributed and client/server AS/400 networks. Because round the clock availability is essential, regardless of platform.

And since our approach concentrates on the availability of business-critical applications, we call it *Availability Management*.

To find out more, call 1-800-843-3970, ext. 919.

**AVAILABILITY**



**MANAGEMENT**



# Something for Nothing

After choosing object technology as the basis for its new technical architecture, Kash n' Karry took the methodology out for a test drive using expertise and free software gleaned from the Internet

BY JIM STIKELEATHER

In May 1991, Kash n' Karry Food Stores Inc., based in Tampa, Fla., undertook an ambitious project to reengineer its entire information infrastructure. We developed a technical architecture based on open-systems standards and object technology to serve as the foundation for this effort.

Our IS group had several hurdles to overcome, including our lack of open-systems expertise and experience in object technology. As a consequence, we were forced to rely on software vendors for information and guidance (at that time, consultants were no better versed in object than we were). This situation was problematic for several reasons. First, we felt that dependence on a software vendor was just as bad as dependence on a hardware vendor—maybe even worse, given the declining price of hardware and the rising price of software. Also, the information that software vendors were giving us did not necessarily agree with what we were learning on our own. Each vendor had its own perspective, influenced by the design and capabilities of its product.

In addition, a lack of standards—particularly in the object area—reduced the probability that we would achieve our portability objectives. Finally, the software was expensive. Although we had the funds to buy what we needed, we didn't want to do it more than once if our initial selections proved suboptimal.

It was about this time that we discovered the Internet. The Internet has more than 15 million users in 137 countries who exchange E-mail, transfer files, search databases and participate in interactive bulletin boards and information forums.

The Internet provided us with a wealth of object-technology information: how-to articles, stories of failures and successes, ongoing research and insights into designs, methodologies and proposed standards. This data saved us time and effort and significantly influenced the design and implementation of our information and technical architectures, standards and methodologies.

## The benefits of public

The Internet proved to be a valuable source of information about object concepts; but it was also a valuable source of free software (as well as software carrying very liberal licensing policies). Universities, government agencies and laboratories—and even vendors and commercial sites—often publish on the Internet software that they have developed to meet a specific need or to test a technological concept. Users of the software provide feedback, as they would for papers and articles. Often the intention is for others to take the software and expand and enhance it for everyone's benefit.

Using public-domain software for our initial development efforts had a number of obvious advantages. If we made a mistake, the recovery would



ILLUSTRATION BY COURTNEY GRANNER



# Public Offerings

The following are some of the public-domain software offerings that Kash n' Karry Food Stores Inc. used successfully in developing an object-based information architecture. All were acquired from the Internet.

**The Interviews Class Library** from Stanford University allowed us to experiment with different approaches to user interfaces while remaining standards-based and greatly increased our ability to reuse objects. A commercial "GUI builder" would have locked us into classes that were controlled and maintained by the user interface.

**The SELF language** from Stanford University allowed us to experiment with the trade-offs of compiled versus interpreted approaches to delivering our systems and with storing code in an integrated information store as opposed to separate code libraries.

**The Garnet language** from Carnegie Mellon University has taught us the "prototype instance" approach to object-oriented programming and design that has become a cornerstone of our information architecture. We have also gained experience in building knowledge-based objects and in specification- and constraint-based programming.

**CLIPS** (C language inference processing system), from the National Aeronautics and Space Administration (NASA), provided experience in building some limited expert systems and taught us how to introduce inference- and rules-based processing into our architecture, designs and systems.

**The C++ compiler** and other products from the Freesoft Foundation enabled us to establish baselines for portability of our programming concepts.

In addition to software that directly supported our engineering and development efforts, we found numerous packages to support our users and assist with the management and configuration of our systems and network.

—J. Stikeleather

be less costly than if we had purchased a commercial product. In addition, because we had no experience with these technologies, determining requirements would have been difficult: Freeware allowed us to try different techniques and methodologies without a high capital risk.

The amount of time needed to master public-domain software is not significantly greater than that needed to master commercial software. In our experience, the only real difference is that classroom training is available for commercial packages. Ironically, the lack of such training

has advantages: Acting as our own teachers, we developed a greater understanding of the products.

Another benefit of free software is the availability of source code. Since we were still wrestling with infrastructure issues, this access gave us more chances to experiment and make better-informed strategic and production decisions. Most commercial tools dictate many of these parameters, such as interprocess-communications techniques; such restrictions limit a company's options and ability to integrate other tools and software.

Finally, because many of the concepts and techniques we wanted to explore were not addressed by commercial software, going the commercial route would have forced us to code our own implementations. But most concepts being written about or researched exist somewhere in a piece of public-domain code.

As we began to use the free software, other advantages became apparent. For example, we found that the documentation of public products equaled or exceeded that of commercial products. Generally, more examples of how to use the software and "theory of operation" information exist in public-domain documentation; this proved especially useful during our learning phase.

Interestingly, we also found that support—albeit in an unusual form—was comparable to what we receive from commercial vendors. Most vendors supply a telephone-support line or a local service person, but public-domain users can post problems or questions on the Internet. In our experience, an intelligent, complete and accurate response generally appeared within 24 hours of asking a question, posted either by the developer or another user with extensive experience. We also obtained information from the postings of interest groups associated with a particular piece of software. From this, we learned early on about bugs, shortcomings, future enhancements and workarounds.

We were pleased to discover that the quality of the free software equaled or exceeded that of the commercial software we use. Part of this, I expect, is due to the motivation of developers of public-domain software. Because the source code is available for perusal by the general public, they take pains to make it intellectually pleasing. Much public-domain software is developed in an academic setting and is therefore subject to extensive and excruciating peer review. (This is particularly true of software that is published on the Internet.) And the creation of public software is often a work of passion rather than just a job to its developers. So they may be more dedicated than commercial developers.



Finally, public software tends to be "pure" in the sense that it serves a single purpose exceptionally well and is not subject to the marketing needs of creeping "featuritis" (although public software evolves very rapidly with contributions from all over the Internet).

### **Downsides**

Our experience with public-domain software was generally positive, but we did discover some downsides that may be unavoidable. First, employee turnover is a fact of life in IS. As a consequence, we seem to be on a perpetual search for replacement staff, and candidates are far more likely to have experience with commercial than with public-domain software. Existing staff members, too, will probably require more in-depth technical training.

In addition, developers are sometimes more concerned with software purity than with making their products marketable. Software not being built for sale may lack basic features that no commercial package could succeed without. And because the developers are not concerned about holding on to customers, they may not care if people have to go through hoops to use or upgrade their products. Several new releases have included radical changes that forced us to alter applications we had already developed. Although this occurs in the commercial world, commercial vendors pay more attention to their installed base and try to make the transition easier.

Public-domain software also generally lacks the performance you would expect from a commercial package. (There are exceptions: The version of SELF we retrieved from Stanford University was designed specifically to stretch the performance of interpreted code and address performance issues unique to object programming). For this reason, much public software may not be appropriate for use in production systems.

Finally, at some point, public-domain builders lose interest in their software. Although a strong user group often develops that will continue to support and enhance the product, there is a risk that the software

will eventually fade away. While commercial vendors also go out of business or change their product lines, a

---

## **Learn about the Internet. It is an incredible source of information, data, software and advice.**

---

competitor is usually waiting with a migration path, or the vendors supply one themselves.

### **Rules of the road**

There are several things an IS department should know before availing itself of free software. First, learn about the Internet: It is a resource with which every IS department should be familiar. Access can be achieved by attaching your network to the Internet, subscribing to a gateway service or using a commercial service, such as Delphi. Once you are connected, many tools (Archie, Gopher, WAIS, Veronica, WorldWide Web) can assist you in the search for resources.

Second, once you find the software, subroutine or data that you require, download the documentation. The quality and quantity of the documentation will provide excellent insight into the quality and usability of the software or data itself.

Third, it is a good idea to find appropriate user or interest groups on the Internet and peruse their postings for information on potential problems, enhancements and support for the product you plan to use.

Fourth, downloading the source code is critical. We review the code for its quality (which dictates the quality of the product) and also look for unnecessary or unusual code that may be hiding viruses or worms. Source code makes us independent while allowing us to test portability between hardware and operating-systems architectures.

### **The last word**

Public-domain software is an option for building and delivering produc-

tion applications. But while often the most-sensible course, it is not necessarily the easiest: It forces the IS department to take on an expanded support role and become more of a systems integrator than is necessary with commercial software. CIOs deciding when to use freeware must evaluate each individual case on its technical and business merits. Public-domain utilities and subroutines are low-risk propositions. Building an entire information infrastructure on public-domain software is a high-risk proposition.

The real value of public-domain software is its informational content. Your IS department can learn new concepts and techniques (in the case of Kash n' Karry, object technology, inference processing, GUIs and client/server architectures), and subsequently make a more-informed decision on what is right for your business. You can prototype not only applications but an entire architecture and create a long-range plan before expending precious capital and time on a commercial product.

Having used public-domain software to create the environment that works best for us, we are now in a position to specify what we want from commercial packages. Perhaps even more important, we can wait until such packages are offered, without compromising our development ability or the integrity of our architecture. Commercial software with the capabilities we liked in public-domain software is just now becoming available. Thanks to the Internet, we know what we want, and we have the experience to take full advantage of it.

One last thought: As is true with many bulletin boards and other sharing groups, Internet users frown on those who only take. When you use the work of others, you incur a moral obligation to offer something in return: software, learning experiences, or simply comments and suggestions about the software you use. The Internet is a kind of community, and communities work best when everyone contributes. ☐

---

*Jim Stikeleather is director of systems development for Kash n' Karry Food Stores Inc., based in Tampa, Fla.*





# The Navy Brought Us Aboard!

*And so did 40 of the  
FORTUNE Top 50.*

The diversity among the world's largest companies belies a common concern that led 40 of them to *one* company . . . for one reason — unique connectivity solutions that leverage a most important asset: information.

## *Glasnost For The Glass House.*

These companies recognized the value of information early on. They invested in IBM mainframes and SNA environments at headquarters and later built TCP/IP LANs to link other locations. As a result, they created huge repositories of information in their home offices, nimble networks in the field — and a frustrating inability to connect the two. Which is why they connected with us.

## *Access. Synthesis. Interoperability.*

Our technology transforms these separate networks into seamless systems. So users the world over can easily access information in the mainframe, in a form synthesized to look like what they're used to. Which means they can actually *use* the information — massage it, manipulate it, integrate it — without compromising the integrity of your corporate database or your control over it!

## *Open Your World Without Closing Your Options.*

Others debate standards, we deliver benefits. So if disparate systems have you looking at open systems, look to us . . . and enjoy the ultimate management option: to embrace new technology *without* risking past investments!

*To Learn More, Call Now.  
(214) 484-5200.*

OpenConnect Systems  
2711 LBJ Freeway  
Dallas, TX 75234

# OPENCONNECT

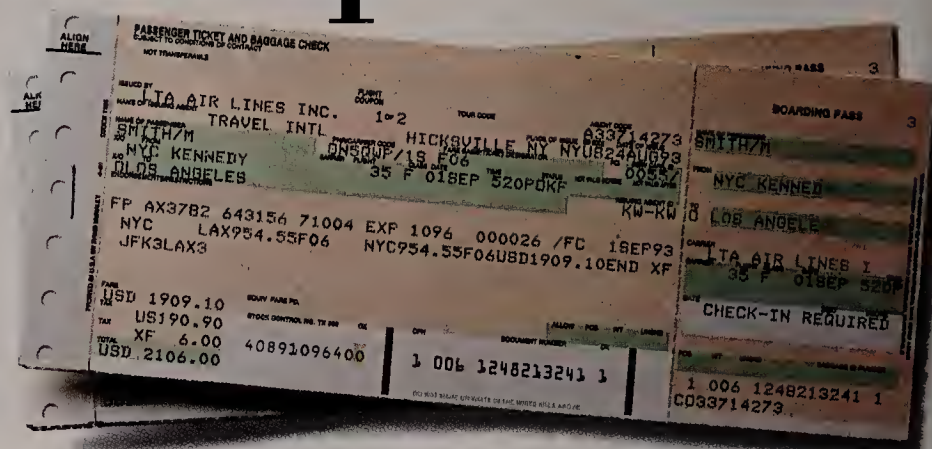
S Y S T E M S

*Transforming Separate Networks Into Seamless Systems.*





What makes the airlines  
on thousands of planes at  
to instantly  
reservations,  
hundred vegetarian meals?







smart enough to keep tabs  
once and quick enough  
respond to millions of  
cancellations and even a few



| DESTINATION   | FLIGHT | TIME | DEPARTS  |
|---------------|--------|------|----------|
| ATLANTA       | 760    | 1:28 | BOARDING |
| BALTIMORE     | 335    | 2:50 | ON TIME  |
| BOSTON        | 668    | 3:43 | ON TIME  |
| CHICAGO       | 112    | 3:30 | DELAYED  |
| DENVER        | 453    | 3:35 | ON TIME  |
| DETROIT       | 407    | 4:15 | ON TIME  |
| LOS ANGELES   | 576    | 4:52 | ON TIME  |
| MIAMI         | 354    | 5:12 | ON TIME  |
| NASHVILLE     | 121    | 6:45 | ON TIME  |
| NEWARK        | 169    | 6:58 | ON TIME  |
| NEW ORLEANS   | 842    | 7:07 | ON TIME  |
| PHOENIX       | 697    | 7:05 | DELAYED  |
| SAN FRANCISCO | 468    | 5:35 | ON TIME  |
| SEATTLE       | 369    | 8:12 | ON TIME  |
| TUCSON        | 225    | 8:30 | ON TIME  |

1:12P

*PCs, workstations and midrange computers, linked to*

## Mainframes, what else?

Obviously, airlines need access to vast amounts of information. Information that could be anywhere from across the airport to across the world.

And, invariably, they need access to that data instantly.

That's why mainframes are such essential parts of their information networks. By being linked to a mainframe, every PC and workstation has instant, around-the-clock access to the enormous amount of information needed to run an airline.

(How else could an agent in Dallas be able to tell in an instant which seats are available on a return flight from Paris—and, the next instant, check how

long that departure from Sydney will be delayed?)

All things considered, nothing “serves” the rest of a computer network’s “clients” to the degree a mainframe can. And the new “openness” of mainframes allows them to serve just about any kind of hardware and software.

Airlines are just one of the many businesses whose success is dependent on information.

On the swift and reliable accessing, managing, distribution and protection of that information.

All the things a mainframe is designed to do. Better than anything else.



## The IBM System/390®



# Vocal Heroes

Before long, speech-recognition technologies could provide the intuitive computer interface we've all been waiting for

BY JOHN PAUL KOWAL

**O**n April 25, 1903, the *Saturday Evening Post* ran a center-spread ad featuring a pudgy fox terrier named Nipper peering into the brass trumpet of a gramophone. The advertising copy for the Victor Talking Machine Co. read, "His Master's Voice." Nipper, the machine and the slogan were to become one of America's most recognized trademarks, representing RCA Victor. (In the original oil painting, the ever-faithful dog was in the foreground peering into the gramophone while his deceased master lay stretched out behind Nipper in an open casket. It was thought that the full painting might be a little heavy-handed, even for advertising, so the background, dead master and casket were painted out.)

The Victor ad held out the promise that technology could capture, store and present the human voice at any time, at the wish of any customer. The reproduction would be so faithful that even an owner's loyal dog could not tell the difference.

Today that early promise has ex-

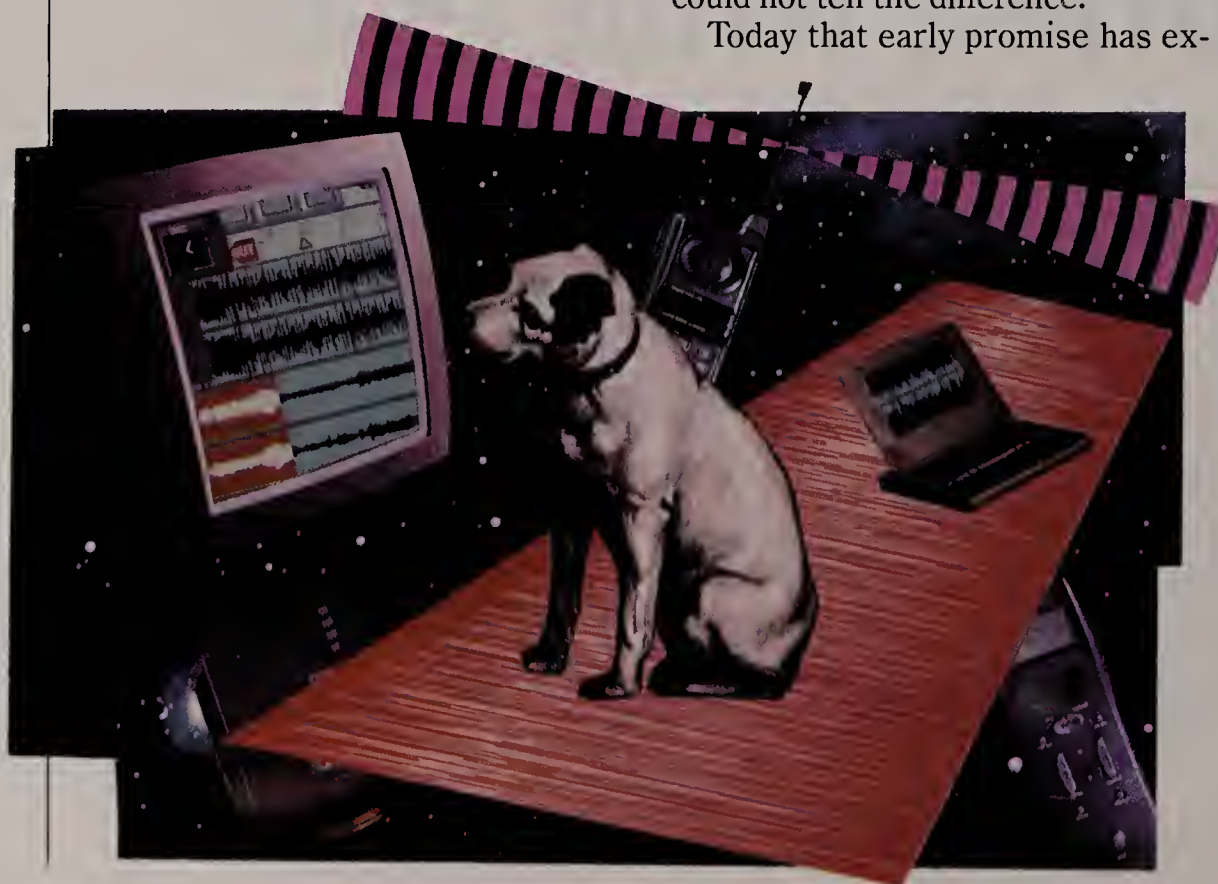
panded to include a wide range of technologies using the human voice. As information services and technologies merge, voice technology could provide a comfortable user interface to the evolving world of electronic data and services.

Multimedia desktop systems armed with this new integrated technology will speed information-sharing and thus decision-making. Transactions, whether personal or business, can take place 24 hours a day, 365 days a year. What telephones did to spatial limits, voice technologies will do to temporal constraints. Concepts like work days and work weeks will lose much of their restrictiveness.

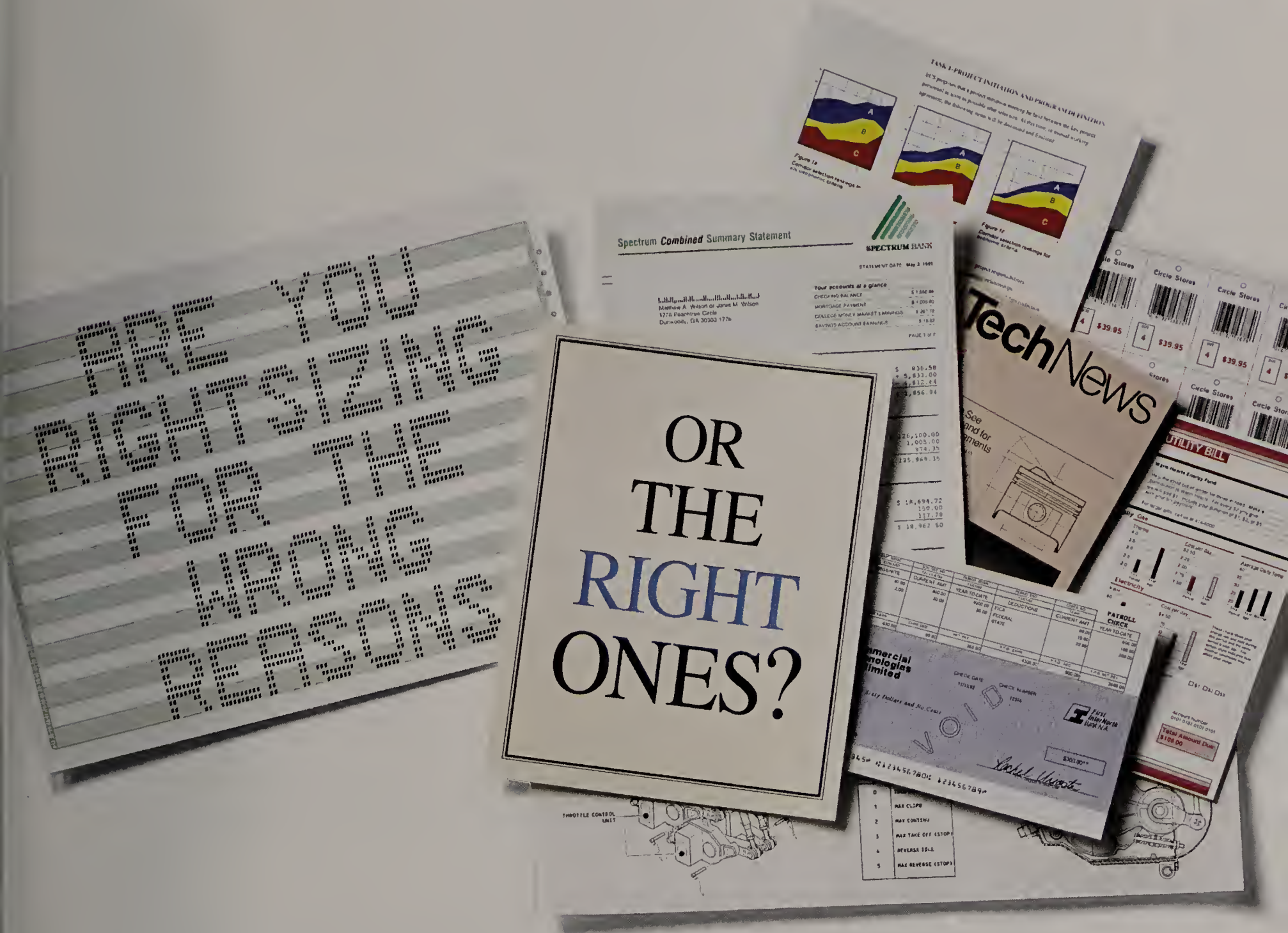
"Communication and information retrieval should occur in the medium that is available to users at the time that they choose to communicate," says Tom Sheridan Hunse, vice president of marketing at InterVoice Inc., a Dallas-based voice-automation vendor. "If I'm in my car, I may want my E-mail messages read to me. If I'm in a hotel, I may want my fax messages displayed on the television. If I'm in my office, I may elect to initiate dialing and retrieval of information on my PC and just see it. I may play my voice messages through my PC."

Elaine Cascio, a consultant at Vanguard Communications Corp., a voice-processing and communications consulting firm in Morris Plains, N.J., agrees. "Ultimately, the tool that you use can be anything," she says. "There aren't going to be specific devices to get specific information. Several voice-messaging systems currently have visual interfaces for PCs that enable you to view your voice and fax messages."

While the future looks bright, emerging and changing technologies complicate the picture. John A. Oberbauer, president of Voice Informa-







When you rightsize information processes from mainframe hosts to midrange systems, it's all too easy to lose the benefits you're looking for by overlooking your output devices. The fact is, continue to use your current printers and you won't be doing justice to all the productivity and performance advantages you can get from rightsizing.

At Xerox, our range of midrange printing solutions lets you make the most of rightsizing by helping you produce documents that do justice to your data. You can access features like duplex printing, multiple paper sizes and drawers, variable fonts, signatures and logos. What's more, you can give your documents the impact of intelligent color, for instance, with a networked printer smart enough

to switch speeds between black and white and color, for increased productivity when printing complete documents.

Our commitment to open architecture means you can do it all without having to alter your current applications' data-streams. Indeed, the Xerox family of printers is right for any AS/400™ or other midrange computer you work with.

To learn more about all the ways Xerox midrange printers can help you do the right thing, simply make the right call, **1-800-ASK-XEROX, ext. 737.**

**Xerox**  
**The Document Company**



tion Associates Inc., a consulting firm in Lexington, Mass., sees voice technologies falling into two major groups.

The first group includes digitized recorded speech and interactive voice response with touch-tone-telephone input. The second encom-

may be deployed in many products, from talking calculators to smart door locks to computers that transcribe natural conversations or perform functions based on voice commands. Speech-output products could range from a talking dictionary to a system that retrieves data from a

the machine is behind the interface."

But, clearly, speech interface holds out the great hope that users will finally control machines, data and services without resorting to arcane training or using a manual-entry device. Voice technology is ready to move beyond its current status as middleware or an add-on option. But first, voice-technology vendors will need to overcome some technical barriers, enter the mainstream by embedding the technology in already accepted applications, develop strategic business alliances, and help users understand and embrace these changes.

## Market Moves

*An informal review of recent announcements suggests that voice-technology vendors are beginning to move into the mainstream. The following developments have taken place within the past year.*

**D**ragon Systems Inc., of Newton, Mass., announced the commercial availability of a PC-based speech-recognition system, allowing users to talk to their computers rather than type in commands. Retail cost of the system: \$4,995.

IBM Corp. licensed two speech-recognition products from Dragon Systems. One performs command and control functions; the other is a speech-to-text product allowing users to input text and data by speaking rather than typing.

Microsoft Inc. and Intel Corp. announced the Windows Telephony Applications Programming Interface, a proposed API standard for computer-telephone integration.

Creative Labs Inc., of Milpitas, Calif., licensed the speech-recognition engine developed by Voice Processing Corp. of Cambridge, Mass. It will make voice recognition a standard feature in its \$279 Sound Blaster 16 board. It also signed a letter of intent to acquire a company that makes a videophone add-on for Macintosh computers, with plans to move the technology to the IBM PC environment.

Voice Powered Technology Inc. of Canoga Park, Calif., made inroads into the home market with the introduction of VCR Voice Programmer, a handheld, battery-powered device that enables users to program their VCRs, televisions and cable boxes.

Philips Consumer Electronics Co., of Knoxville, Tenn., licensed the voice-recognition technology of Voice Powered Technology. Philips will include a VCR voice controller with four models marketed under the Magnavox and Philips brand names.

—J.P. Kowal

passes advanced voice technologies, including speech recognition and true synthetic speech stored in computer text files, for commanding systems and machines and interacting with users.

"Speech or voice can be the interface for any intelligent machine," Oberteuffer says. Voice technology

remote database over the telephone and speaks it back using synthetic speech.

It is easy to become carried away with voice technology's potential as the interface for human/machine operations. Oberteuffer is quick to point out that "the application of the technology depends upon how intelligent

**T**he integration of telephones, computer-command functions, software applications, voice mail, E-mail, fax and video is where most people think the technology is going. "All these technologies are of dissimilar manufacture," says Hunse. "Each has its own user interface. The technology will proliferate and the public will accept it if they can understand how to relate to it and how it will provide value in their lives." What is needed, says Hunse, is "a universal or one-voice platform that allows you to navigate through those systems that are dissimilar, through a common user interface, using your voice or a touch-tone telephone."

The current voice-technology market is growing 30 percent each year, according to a 1993 study by Voice Information Associates. The study, which surveyed 105 vendors of base technology, boards and systems in the automatic speech-recognition (ASR) industry, projects that the end-user value of ASR will be \$750 million by 1997, up from \$189.3 million in 1992. This includes applications, software and hardware essential for the sale and implementation of ASR systems.

According to the study, this rapid market growth is the result of lower costs and improvements in speech-recognition accuracy and capability. The availability of more-powerful, less-expensive personal computers and better speech-processing tech-





# THE ONLY THING MISSING FROM OUR CHILI RECIPE IS YOU.

## ANNOUNCING MICROGRAFX FIFTH ANNUAL CHILI FOR CHILDREN COOK-OFF

It's not often you can combine, music, fun and quite possibly the most outlandish chili recipes anywhere to accomplish something so worthwhile. Your company has the opportunity to become an official sponsor for the Micrografx Fifth Annual Chili For Children Cook-Off, benefitting the National Center For Missing & Exploited Children.

Chili For Children is one of the most popular and highly visible events at Comdex. The evening features outstanding musical entertainment and visual demonstrations by today's leading-edge technological innovators. Past corporate participants have included IBM, Intel, Microsoft, Lotus, Hewlett Packard and many more, all coming together to raise donations for an outstanding cause. The National Center For

Missing & Exploited Children handles tens of thousands of cases each year and has helped reunite many missing children with their families.

Corporate sponsorships range from \$30,000 to as little as \$500, and sponsorship entitles you to a variety of premiums ranging from tickets, to chili cooking booths, to T-shirts. It all takes place November 16, 1993, from 6 to 11 p.m. at the Thomas & Mack Center (UNLV), Las Vegas, Nevada during Comdex Fall 1993. To find out how your company can get involved or if you want individual tickets, call TicketMasters at 1-800-848-4615. It's sure to give everyone involved a very warm feeling inside

**BENEFITTING THE NATIONAL CENTER FOR MISSING & EXPLOITED CHILDREN**





## Voice Venues

*The voice-technology market can be broken down into six segments, according to John A. Oberteuffer, president of Voice Information Associates Inc.*

**Computer control:** Offers hands-and eyes-free operation. Recognition is often speaker-dependent (the system is trained to understand words spoken in a particular user's voice, allowing for a somewhat larger vocabulary). Applications include computer-aided design input, machine control, and language and air-traffic-control training.

**Data entry:** In addition to enabling hands-free operation, eliminates transcription and allows immediate data entry. Used in quality control, inspection and inventory.

**Speech-to-text:** Includes systems for report generation and voice dictation. Can create complete written reports using voice only.

**Telephone:** Products with small vocabularies provide an interactive voice response, as in automated-operator services and financial transactions.

**Voice verification:** Used for physical entry to buildings or other facilities, computer-network access and long-distance calling (human voice prints are as distinctive as fingerprints). Also used to verify compliance with home incarceration.

**Consumer:** Applications include voice-activated cellular telephones, toys and appliances. —J.P. Kowal

niques, such as the refinement of powerful statistical algorithms for acoustical speech analysis, are the driving forces.

The next commonly accepted milestone for voice technology will be its ability to recognize, without difficulty or error and without requiring previous training, a vocabulary of more than 100 words of naturally paced speech spoken by any person. (Accuracy is much more difficult to

achieve with the move from discrete to continuous speech.)

Hunse thinks that could happen domestically within a couple of years. He points to the difficulty of decoding speech in a country where there are 40 dialects of spoken English. But those problems should be solved

---

### What telephones did to spatial limits, voice technologies will do to temporal constraints.

---

by a new generation of faster microprocessors that will allow systems to filter the spoken word more quickly and interpret those regional dialects, he says.

"Right now we have to provide the user with a balance between an acceptable level of voice recognition and an acceptable time delay," Hunse says. "[Callers'] willingness to tolerate waiting diminishes every day."

For vendors, the complications grow as the technology goes international. "We have our systems in 38 countries, and there are 26 languages spoken in those countries," says Hunse. "The international market lags somewhere between 24 and 48 months in terms of acceptance of this technology. That's good because we can prove the technology here."

A number of changes must occur before the next level of success is achieved. First, developers of speech-recognition engines must develop relationships with independent software vendors in order to gain both their acceptance and their promotional power and thus move the technology from its middleware status to the mainstream. Also, for voice-recognition software to be able to try out a greater number of hypotheses, desktop systems need more RAM, hard-disk space and MIPS. And before voice technology can gain widespread acceptance, it must be easy to use and inexpensive to

own and operate. Great strides have already been made in this direction. Currently available speech-recognition systems could not have been created five years ago, because the algorithms and inexpensive computer power wasn't available.

Voice technology will be most valuable when it is able to provide transparent, remote access to machines, especially computers. The telephone infrastructure is the highway over which all this traffic will travel. The good news is that the United States has more than 1 billion miles of transmission lines. The bad news is that the kind of remote, free-form dictation we're talking about here requires the high-bandwidth capability of fiber-optic lines, and existing copper wire won't be completely replaced by fiber until sometime between 2000 and 2010.

Along with the rest of the technology world, many voice-technology vendors are beginning to move to open systems. "The market itself is changing," says Vanguard's Cascio. "Today, vendors provide systems that allow you to do a number of things on a single platform: access faxes, voice response, voice messaging. But this requires proprietary hardware in your telephone room."

Companies purchasing voice technologies should look for vendors moving to standards and open systems. Cascio suggests asking the following questions: "Are they going with a proprietary architecture? Are they enabling their systems to be open enough so that folks can integrate them with fax machines, E-mail systems, with LANs, with WANs, with video, with any other type of information-sharing device?" If not, that vendor may not be the best choice.

The promise of voice technology initiated 90 years ago in the *Saturday Evening Post* ad is on the verge of being fulfilled. With the advent of voice-controlled computers and other devices, the new slogan should be *Its Master's Voice*. ☐

---

*John Paul Kowal is a business and technology writer based in Brookline, Mass.*



# We're willing to hide our award winning covers so your customers can see you first.



Rise above the advertising noise and clutter with the *CIO Executive Subscription Program*. A gift subscription of *CIO* to your prospects and customers, which includes a four-page cover wrap to launch the introductory issue plus three additional wrapped issues, insures maximum exposure and continuous impact throughout the year.

The *CIO Executive Subscription Program* enables you to demonstrate your customer commitment by providing your best prospects and customers with valuable information on the trends and issues confronting IS executives, while simultaneously reinforcing your sales message—all at a minimal investment. For only \$49 per subscription, your prospects and customers will receive 21 issues of *CIO*. That's \$2.33 an issue!

*CIO* will help you develop an Executive Subscription Program that fits your corporate image and budget. Just give us a call at (508) 935-4036 and ask for Nancy O'Connell, Executive Subscription Program Manager.



THE MAGAZINE FOR INFORMATION EXECUTIVES



A man in a dark suit, white shirt, and patterned tie stands in the foreground, pointing his right hand towards a large screen. The screen displays a city skyline with two prominent towers. In the background, the Golden Gate Bridge is visible against a blue sky. The overall scene is set in a dark, possibly indoor, environment.

RON GLOVER  
PRESIDENT  
**D&B**  
INFORMATION SERVICES  
NORTH AMERICA



NEED SOME ADVICE  
ON VIDEO  
SOLUTIONS?  
CALL  
ME  
1-800-846-2355  
I'LL TELL YOU  
BELL ATLANTIC'S A  
SMART BUSINESS MOVE

We're Dun & Bradstreet Information Services, N.A. The leader in providing information to help businesses make more profitable decisions. One of the best business decisions we made was selecting the companies of Bell Atlantic\* to meet our internal videoconferencing needs. To make us totally comfortable with the benefits of the technology, they proposed a 12-month trial. In just four months, Bell Atlantic had a turnkey, enterprise-wide, videoconferencing system up-and-running, linking nine offices across the country. And we're already seeing the results. The ability to call videoconferences together at a moment's notice and to bring expertise together from around the country is making Dun & Bradstreet more responsive. We're working smarter, solving problems and finishing projects faster. At Dun & Bradstreet Information Services, we help companies realize their potential with information to make better business decisions. Bell Atlantic showed us how to reach our potential with custom videoconferencing solutions. So, give me a call, I'll tell you how Bell Atlantic is helping to keep Dun & Bradstreet Information Services on the forefront of communications technology.

 **Bell Atlantic**  
We're More Than Just Talk.®

Callers will hear a recorded message from Mr. Glover, and will be given the opportunity to leave a message for him or to speak with a Bell Atlantic representative. \*The Bell Atlantic family of companies includes the Bell Atlantic Systems Group, New Jersey Bell, Bell of Pennsylvania, Diamond State Telephone, the C&P Telephone Companies and other communications and information management companies. Interexchange services were provided by Dun & Bradstreet's preferred interexchange carrier; local exchange services were provided by the Bell Atlantic companies and other authorized providers in their local serving areas. © 1993 Bell Atlantic.



# FYI

## Bridging the Generation Gap

**M**ost companies would like to be able to preserve their mainframe investment while opening the door to new technologies. An application generator from Magna Software Corp. has been introduced for that purpose. Magna X, a Unix-based online transaction processing (OLTP) application generator, facilitates the integration of Unix and open systems with mainframe databases and applications.

The product masks the complexity of the underlying technology, enabling developers to focus on the business requirements of their applications. Developers can graphically specify applications on their PCs, which are connected to a shared workgroup dictionary on a Unix server; this allows multiple developers to work simultaneously on the same application. Unix-based applications are then generated and executed across distributed Unix platforms and mainframes, thus making the mainframe an integrated part of the client/server architecture.

Designed for Unix System Laboratories' Tuxedo TP monitor, Magna X generates standard Cobol. Introductory pricing, available through Dec. 31, is \$40,000 per development server (including one application server and five workstations). Call 212 691-0300.

## An Enterprising Solution

**D**un & Bradstreet Software is offering an integrated suite of financial applications that consists of business "activities," including journal processing, payment request and invoice approval.

Financial Stream is the first release in a series of application suites, which will include HR Stream, Distribution Stream and Manufacturing Stream. The SmartStream series is client/server-based enterprise solution composed of integrated business applications, decision-support facilities and a workflow-enabled platform.

Financial Stream enables cross-functional monitoring of financial information and business processes; it also provides quick feedback for proactive decision-making. The product is stored in a relational database, ensuring access to critical information. In addition, Financial Stream comes packaged with Decision Support 2.0, which automates host-to-server-to-user electronic distribution of personalized views of business information.

Available in controlled release under Hewlett-Packard and Data General environments, Financial Stream sells for \$225,000. SmartStream Decision Support 2.0 can be purchased separately for \$100,000. For more information, call 508 370-5000.

## A Personal Book Maker

**I**f you've been putting off moving to a desktop-publishing environment or upgrading your current investment because of cost, JCC Corp. may have a solution to get you started. The company introduced a RISC-based X terminal for \$4,995 that allows merging of text and graphics and offers full-page pagination. According to JCC, that's less than one-quarter the cost of a workstation offering the same resolution.

The GX1600 provides a 21-inch screen that boasts resolution of 1,600 by 1,280 dots per inch. Users can view a page in its current state, view two versions of the same page next to each other, and examine a document on a WYSIWYG basis. In addition, the high-resolution terminal enables full-color separation by exchanging graphics from other color terminals and workstations.

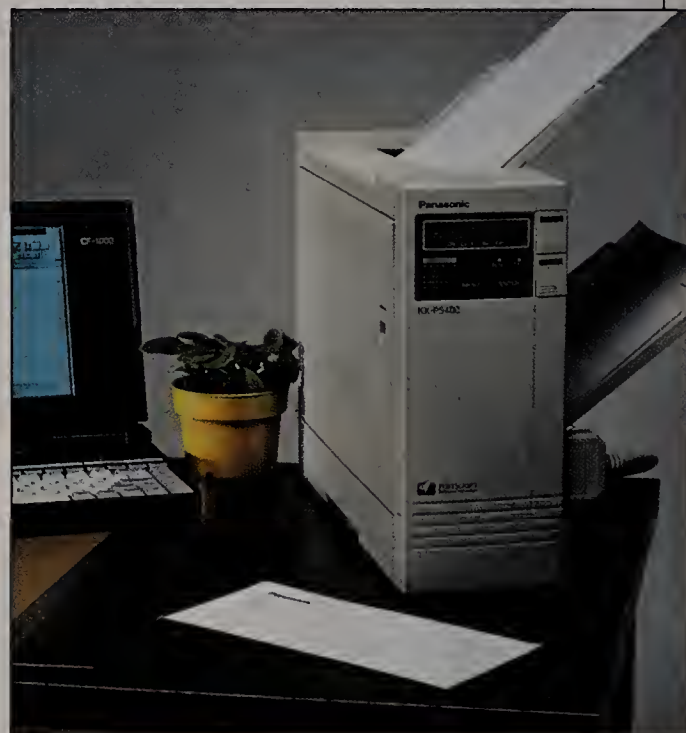
Hardware optimization of the product includes minimizing data lengths and error packets and using an X server accelerator to offload X primitives to hardware. The X terminal uses higher hardware performance and maximizes operations locally, thus resulting in lower loads on the network.

For more information, call 201 592-5023.

## Standing Room Only

**I**s your office space limited? Panasonic Communications & Systems Co.'s SideWriter printer offers a way to get the most out of a small space.

The SideWriter measures 5 by 11 by 14 inches, weighs 14.3 pounds and has a .52-square-foot footprint—



the industry's smallest, according to Panasonic.

Two laser-quality printers are available: the SideWriter KX-P5400, featuring Adobe's PostScript printer language, and the SideWriter KX-P4400, with Hewlett-Packard's PCL4 printer language. The KX-P4400 can also be used as a plain-paper fax machine with the purchase of a fax option.

The printers provide an output rate of four pages per minute and can be used with all IBM-compatible desktop, laptop or notebook PCs. (The KX-P5400 also features the option of an AppleTalk interface, making it Macintosh-compatible.) Both offer resolutions of 300 dots per inch and use parallel interfaces.

The KX-P4400, with 28 bitmap fonts, costs \$649; the KX-P5400, with 17 scalable fonts, costs \$999. For additional information, call 201 348-7000.





## I N D E X

Page numbers refer to the first page of the article(s) in which the company is mentioned. State of the Art, which begins on Page 102, contains the names of companies too numerous to mention. This index is provided as a service to readers. The publisher does not assume any liability for errors or omissions.

### Company Index

|                                   |            |
|-----------------------------------|------------|
| ARDIS.....                        | 86         |
| AT&T.....                         | 62, 86     |
| Adobe Systems Inc. ....           | 110        |
| Advanced Micro Devices Inc.....   | 26         |
| AmeriGas Propane Inc.....         | 62         |
| Andersen Corp.....                | 46         |
| Apple Computer Inc.....           | 26         |
| CIMI Corp.....                    | 62         |
| CalGas.....                       | 62         |
| Chevron Corp.....                 | 34         |
| Compaq Computer Corp.....         | 26         |
| Continuum Co., The.....           | 34         |
| Data General Corp.....            | 110        |
| Dell Computer Corp.....           | 26         |
| Desktop Data Inc.....             | 112        |
| Devonrue Ltd.....                 | 34         |
| Digital Equipment Corp.....       | 26         |
| Dun & Bradstreet Software.....    | 110        |
| General Electric.....             | 62         |
| Hewlett-Packard Co.....           | 26, 110    |
| IBM Corp.....                     | 26, 110    |
| Intel Corp.....                   | 26         |
| Interactive Solutions Inc.....    | 16         |
| JCC Corp.....                     | 110        |
| Johnson & Higgins.....            | 112        |
| Kash n' Karry Food Stores Inc.... | 96         |
| Lotus Development Corp....        | 86, 112    |
| MCI.....                          | 62         |
| Magna Software Corp.....          | 110        |
| Mainstream Data Inc.....          | 16         |
| Maxis.....                        | 34         |
| Microsoft Corp.....               | 16, 86, 26 |
| Motorola Inc.....                 | 86         |
| National Semiconductor Corp....   | 86         |
| Otis Elevator Co.....             | 16         |
| Pacific Gas Electric Co.....      | 34         |
| Pacific Gas Transmission.....     | 62         |
| Panasonic.....                    | 110        |

|                                              |     |
|----------------------------------------------|-----|
| Pluma Software.....                          | 34  |
| RAM Mobile Data Corp.....                    | 86  |
| Salomon Inc.....                             | 62  |
| Scientific and Engineering Software Inc..... | 34  |
| SkyTel.....                                  | 86  |
| Sprint Corp.....                             | 62  |
| Strat-X International.....                   | 34  |
| Sun Microsystems Inc.....                    | 26  |
| Symantec Corp.....                           | 86  |
| Systems Modeling Corp.....                   | 34  |
| Texas Instruments Inc.....                   | 26  |
| Tom Snyder Productions.....                  | 34  |
| Unix System Laboratories.....                | 110 |
| Whirlpool Corp.....                          | 34  |
| WiLtel.....                                  | 62  |

### Advertiser Index

|                                    |                     |
|------------------------------------|---------------------|
| ARDIS.....                         | 13                  |
| Bell Atlantic.....                 | 108                 |
| Bell Atlantic (Regional).....      | 31                  |
| CIO Publishing Inc.....            | 61, 107             |
| Candle Corp.....                   | 94                  |
| Cisco Systems Inc.....             | 19                  |
| Computer Associates Intl. Inc....  | 2, 51               |
| Daly & Wolcott.....                | 25                  |
| Dataflex Corp. (Regional).....     | 52A                 |
| Digital Equipment Corp.....        | C2                  |
| Ernst & Young.....                 | C4                  |
| Exide Electronics.....             | C3                  |
| IBM Corp.....                      | 59, 60, 72, 88, 100 |
| IBM Multimedia Solutions.....      | 53                  |
| Information Builders Inc.....      | 9                   |
| Informix Inc.....                  | 85                  |
| Interleaf Inc.....                 | 22                  |
| Lawson Software.....               | 69                  |
| Lotus Development Corp.....        | 44, 71              |
| Lucas Management Systems Inc....   | 81                  |
| Micro Focus.....                   | 87                  |
| Micrografx.....                    | 105                 |
| NCR Corp.....                      | 14                  |
| NYNEX.....                         | 21                  |
| Nat'l. Education Training Group .. | 36                  |
| OpenConnect Systems Inc.....       | 99                  |
| Pennant Systems.....               | 32                  |
| Racal-Datcom Inc.....              | 27                  |
| Sequent Computer Systems Inc....   | 4                   |
| Skill Dynamics.....                | 6                   |
| Southwestern Bell (Regional).....  | 31                  |
| Sun Microsystems Inc.....          | 10                  |
| SunSoft.....                       | 38                  |
| Sybase Inc.....                    | 91                  |
| Symbol Technology Inc.....         | 17                  |
| SynOptics Communications Inc....   | 28                  |
| Texas Instruments Inc.....         | 66                  |
| Unisys Corp.....                   | 82                  |
| VTEL.....                          | 78                  |
| Xcullenet.....                     | 93                  |
| Xerox Corp.....                    | 103                 |

**Editorial, Advertising and Business Offices:** 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208, (508) 872-8200. **Postal Information:** CIO (ISSN 0894-9301) is published monthly; and semimonthly in April, May, June, September, October and November by CIO Publishing Inc., 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. Second-class postage paid at Framingham, MA, and at additional mailing offices. **Reprints:** Copyright 1993 by CIO Publishing Inc. All rights reserved. Reproduction of material appearing in CIO is forbidden without written permission. Send all reprint requests to Permissions Editor, CIO, 492 Old Connecticut Path, PO Box 9208, Framingham, Massachusetts 01701-9208. **Photocopy Rights:** Permission to photocopy for internal or personal use or the internal or personal use of specific clients is granted by CIO for users through the Copyright Clearance Center (CCC), provided that the base fee of \$3.00 per copy of the article, plus \$.50 per page is paid directly to Copyright Clearance Center, 27 Congress Street, Salem, Massachusetts 01970. Please specify: ISSN 0894-9301. Permission to photocopy does not extend to contributed articles followed by this symbol: \$. **Microfilm:** CIO issues and articles can be purchased on 16mm and 35mm microfilm and on 105mm microfiche through University Microfilms International, Serials Acquisitions Department, 300 N. Zeeb Road, Ann Arbor, Michigan 48106. **Subscriptions:** Address inquiries to CIO, 492 Old Connecticut Path, P.O. Box 9208, Framingham, Massachusetts 01701-9208. CIO is free to qualified information executives. To all others the one-year basic rate is \$78 for U.S. and Canada, \$175 for foreign countries (payable in U.S. funds only). The single copy price is \$7. Please allow 4 to 6 weeks for new subscriptions to begin. **Change of Address:** Please fax a copy of current subscription label along with new address to (508) 872-0618. Allow 4 to 6 weeks for change to take effect. **Postmaster:** Send change of address to CIO, P.O. Box 489, Northbrook, Illinois 60065-9816.

## CIO Sales Offices

### President and Publisher

JOSEPH L. LEVY  
508 935-4601

### Director of Advertising Sales

MICHAEL J. MASTERS  
201 244-5510

### List Services Manager

STEPHANIE LEGELIS  
508 935-4433

### Exec. Subscription Program Manager

NANCY A. O'CONNELL  
508 935-4036

CIO Publishing Inc.  
492 Old Connecticut Path  
PO Box 9208  
Framingham, MA 01701-9208  
508 872-8200, FAX 508 872-0618

### EAST COAST/NORTH CENTRAL

#### Regional Manager/Advertising Sales

FRANK S. GENOVESE  
201 244-5505

#### District Manager/Advertising Sales

EILEEN TRAPP  
201 244-5507

#### Advertising Sales Associate

KIRSTIN L. PIHL  
CIO Publishing Inc.  
30 Two Bridges Road, Suite 110  
Fairfield, NJ 07004  
201 227-1140, FAX 201 227-1565

### NEW ENGLAND

#### Regional Director/Advertising Sales

LINDA L. BURTON  
508 935-4039

#### Advertising Sales Associate

DOT CASPERSEN

CIO Publishing Inc.

492 Old Connecticut Path  
PO Box 9208

Framingham, MA 01701-9208

508 872-8200, FAX 508 872-0618

### SOUTH CENTRAL/EASTERN CANADA

#### Regional Manager/Advertising Sales

ROBERT E. SAWDON

#### Advertising Sales Associate

DEBBIE LIVELY

CIO Publishing Inc.

5495 Beltline Road, Suite 240

Dallas, TX 75240

214 239-5736, FAX 214 239-5734

### WEST COAST/WESTERN CANADA

#### Regional Director/Advertising Sales

GERALD E. PARSONS  
415 693-1987

#### Regional Manager/Advertising Sales

RICHARD BASTAS  
415 693-1988

#### Advertising Sales Associate

JOCELYN D. ERTEL

CIO Publishing Inc.

220 Montgomery Street, Suite 1120

San Francisco, CA 94104

415 398-8200, FAX 415 398-4649

CIO is a publication of International Data Group, the world's largest publisher of computer-related information and the leading global provider of information services on information technology. International Data Group publishes over 194 computer publications in 62 countries. Forty million people read one or more International Data Group publications each month. International Data Group's publications include: **ARGENTINA'S** Computerworld Argentina, Infoworld Argentina; **ASIA'S** Computerworld Hong Kong, PC World Hong Kong, Computerworld Southeast Asia, PC World Singapore, Computerworld Malaysia, PC World Malaysia; **AUSTRALIA'S** Computerworld Australia, Australian PC World, Australian Macworld, Network World, Reseller, IDG Sources; **AUSTRIA'S** Computerwelt Oesterreich, PC Test; **BRAZIL'S** Computerworld, Mundo IBM, Mundo Unix, PC World, Publish; **BULGARIA'S** Computerworld Bulgaria, Ediworld, PC Welt, PC & Mac World Bulgaria; **CANADA'S** Direct Access, Graduate Computerworld, InfoCanada, Network World Canada; **CHILE'S** Computerworld, Informatica; **COLOMBIA'S** Computerworld Colombia; **CZECH REPUBLIC'S** Computerworld, Elektronika, PC World; **DENMARK'S** CAD/CAM WORLD, Communications World, Computerworld Danmark, LOTUS World, Macintosh Produktkatalog, Macworld Danmark, PC World Danmark, PC WorldProduktguide, Windows World; **ECUADOR'S** PC World; **EGYPT'S** Computerworld (CW) Middle East, PC World Middle East; **FINLAND'S** MikroPC, Tietoviikko, Tietoverkko; **FRANCE'S** Distributique, GOLDEN MAC, InfoPC, Languages & Systems, Le Guide du Monde Informatique, Le Monde Informatique, Telecoms & Reseaux; **GERMANY'S** Computerwoche, Computerwoche Focus, Computerwoche Extra, Computerwoche Karriere, Information Management, Macwelt, Netzwerk, PC Welt, PC Woche, Publish, Unit; **HUNGARY'S** Alaplap, Computerworld SZT, PC World; **INDIA'S** Computers & Communications; **ISRAEL'S** Computerworld Israel, PC World Israel; **ITALY'S** Computerworld Italia, Lotus Magazine, Macworld Italia, Networking Italia, PC World Italia; **JAPAN'S** Computerworld Japan, Macworld Japan, SunWorld Japan, Windows World; **KENYA'S** East African Computer News; **KOREA'S** Computerworld Korea, Macworld Korea, PC World Korea; **MEXICO'S** Compu Edicion, Compu Manufactura, Computacion/Punto de Venta, Computerworld Mexico, MacWorld, Mundo Unix, PC World, Windows; **THE NETHERLANDS'** Computer! Totaal, LAN Magazine, MacWorld; **NEW ZEALAND'S** Computer Listings, Computerworld New Zealand, New Zealand PC World; **NIGERIA'S** PC World Africa; **NORWAY'S** Computerworld Norge, C/World, Lotusworld Norge, Macworld Norge, Network, PC World Ekspress, PC World Norge, PC World's Product Guide, Publish World, Student Data, Unix World, Windowsworld; **IDG Direct Response**; **PANAMA'S** PC World; **PERU'S** Computerworld Peru, PC World; **PEOPLE'S REPUBLIC OF CHINA'S** China Computerworld, PC World China, Electronics International, China Network World, IDG HIGH TECH BEIJING'S New Product World, IDG SHENZHEN'S Computer News Digest; **PHILIPPINES'** Computerworld, PC World; **POLAND'S** Computerworld Poland, PC World/Komputer; **PORTUGAL'S** Cerebro/PC World, Correio Informatico/Computerworld, MacIn; **ROMANIA'S** PC World; **RUSSIA'S** Computerworld-Moscow, Mir-PC, Sety; **SLOVENIA'S** Monitor Magazine; **SOUTH AFRICA'S** Computing S.A.; **SPAIN'S** Amiga World, Computerworld Espana, Comunicaciones World, Macworld Espana, NeXTWORLD, PC World Espana, Publish, Sunworld; **SWEDEN'S** Attack, ComputerSweden, Corporate Computing, Lokala Nätverk/LAN, Lotus World, MAC&PC, Macworld, Mikrodatorn, PC World, Publishing & Design (CAP), Datalingenjoren, Maxi Data, Windows World; **SWITZERLAND'S** Computerworld Schweiz, Macworld Schweiz, PC & Workstation; **TAIWAN'S** Computerworld Taiwan, Global Computer Express, PC World Taiwan; **THAILAND'S** Thai Computerworld; **TURKEY'S** Computerworld Monitor, Macworld Türkiye, PC World Türkiye; **UKRAINE'S** Computerworld; **UNITED KINGDOM'S** Lotus Magazine, Macworld, Sunworld; **UNITED STATES'** AmigaWorld, Cable in the Classroom, CD Review, CIO, Computerworld, Desktop Video World, DOS Resource Guide, Electronic News, Federal Computer Week, Federal Integrator, GamePro, IDG Books, Infoworld, Infoworld Direct, Laser Event, Macworld, Multimedia World, Network World, NeXTWORLD, PC Games, PC Letter, PC World, Publish, Sumeria, SunWorld, SWATPro, Video Event; **VENEZUELA'S** Computerworld Venezuela, MicroComputerworld Venezuela; **VIETNAM'S** PC World Vietnam.



# Selective News Service

**Johnson & Higgins, a New York insurance brokerage, has developed a system to access, filter and deliver relevant data to brokers' desks as they need it**

**A**t 148 years old, insurance brokerage Johnson & Higgins predates the Civil War. And until recently, its brokers were stuck with data-retrieval options that were nearly as out-of-date as hoop skirts and corsets.

But since 1990, the New York-based company has been rolling out J&H InfoEdge, a homegrown, Lotus Notes-based information-retrieval system. The system has reworked the way J&H does business and netted the company a 1993 *Computerworld* Smithsonian Award.

An insurance broker's job is to find the most advantageous policies for its client companies, even those that are high risk (J&H insured the Titanic). As a global brokerage, J&H must keep pace with a fast-changing business environment. "We need news on a real-time basis," says Bill Wilson, vice president of MIS, who spearheaded the project along with CIO Alan Page.

Previously, J&H brokers had to wade through a melange of paper repositories, databases and trade journals to get data on a given company. Although the firm sent periodic market summaries out to its brokers, these were often outdated by

the time they appeared. For example, an insurance company could have a rating change that would affect J&H's decision to use it.

InfoEdge, which runs on a network, is customized to brokers' individual needs, automatically channeling predefined data from other applications, image databases, leased lines, FM receivers, optical disks and manual input to the desktop. NewsEDGE, a live news-wire service from Desktop Data Inc., is also tied into the system, delivering news feeds from more than 50 newspapers and wire services. Now, Wilson says, employees can get general news, company profiles (including SEC status), up-to-date financial data on insurance companies, and information on the state of the marketplace—online and on time.

Because the entire package runs over Notes and uses it as a communications backbone, employees are discovering new, interactive methods of working together. For instance, they use the Notes discussion database to brainstorm worldwide on a given problem. "Responses come back from London, San Francisco, Boston, Bermuda," Wilson says. "Before, you would have had to have a conference call and choose the people on the call.

Now 1,200 people can respond, and the person with the answer might be a person you might not have thought to [involve] in the old days."

InfoEdge has cut down on intermediary clerical steps, Wilson says. Previously, clerical workers were involved in sending faxes, and it could take hours for a single document to be typed, edited, revised, approved and sent—especially to multiple recipients. A new internally developed application now lets brokers send and receive such faxes from their desks in minutes.

Wilson estimates that with about 75 employees coming online each month, he should get all 8,000 on by 1996. Part of the bottleneck here is the company's IT infrastructure, which is predominantly based on AS/400s. "If we had an entire LAN platform in place, we could accelerate the Notes implementation," he says.

But bottleneck or no, Wilson says that InfoEdge ensures that his company's brokers are getting all the information they need. "Now, in a matter of minutes, you can read all the information on the topics you are following and have confidence that you are covering everything. It would be impossible to do that otherwise."

—Carol Hildebrand

## VITAL STATISTICS

**Organization:** Johnson & Higgins, New York

**Application:** J&H InfoEdge data-retrieval system

**Sponsors:** Bill Wilson, vice president of MIS, and Alan Page, chief information officer

**Technologies:** Lotus Notes, CD/Notes, One Source Division, Lotus Notes: Document Imaging, all from Lotus Development Corp.; NewsEDGE from Desktop Data Inc.; entire package runs over Windows workstations and OS/2-based servers linked by LANs

**Scope:** Currently 1,200 employees; all 8,000 will be online by 1996

**Objective:** To provide brokers with critical, filtered information as they need it

**Payoff:** Having the information they need to evaluate insurance providers enables J&H brokers to better match clients with insurers; workgroup-style technologies open up entire company as a knowledge pool; technology-enabled process reengineering has eliminated some clerical work



# You Can't Manage Your Network, If You Can't Manage Your Power.



The issue isn't just  
power protection  
anymore. When it

Powerware Network Management Solutions  
provide power management  
for Ethernet and token rings  
running **SNMP**.



comes to complete network power

management, look to

Powerware® Solutions from

Exide Electronics. New

power management

solutions that offer UPS

technology and software

compatibility for high

performance networks. OnliNet® Network

Power Management Software has

real-time monitoring, shutdown,

event logging, and remote control

that extend far beyond the simplistic monitoring of

typical UPS add-on software.



Novell, UNIX, OS/2, and

Windows NT solutions are

backed with unequalled

expertise and a

worldwide service group.

If managing your network

is more important than just running

it, get the only UPS system capable of

doing it. Powerware Solutions from Exide Electronics.

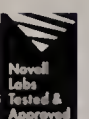
*For a free video introduction to Powerware Solutions for  
Network Power Management, call us or return the enclosed card.*

**1-800-554-3448 X579**

**EXIDE ELECTRONICS**

*Helping You Stay In Power®*

8521 Six Forks Road, Raleigh, NC 27615 • 919-872-3020 • 800-75-EXIDE FAX • International: 919-870-3150 • 919-870-3300 FAX







Engineered.

Reengineered.

Thinking of reengineering? It's one good reason to call the consultants at Ernst & Young. Because we're the leader, we can help you move fast. And that means a higher return on your investment.

Let's talk. Call Terry Ozan, (212) 773-5610.

 **ERNST & YOUNG**